United States
Department of
Agriculture

Economic
Research
Service

Resources and
Technology
Division

The U.S. Agricultural Resources Model (USARM)

Data Construction and Updating Procedures

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The U.S. Agricultural Resources Model (USARM): Data Construction and Updating Procedures, by Ricardo E. Quiroga, Kazim Konyar, and Ian McCormick. Resources and Technology Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 9304.

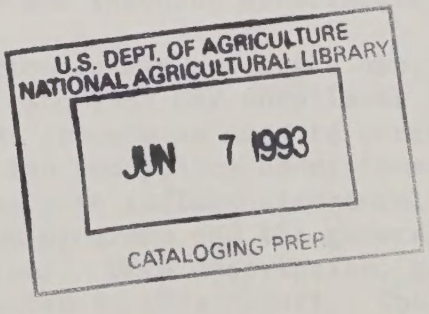
Abstract

As part of its ongoing research into agricultural policy and natural resource use, the Resources and Technology Division of USDA's Economic Research Service developed the U.S. Agricultural Resources Model (USARM). This partial equilibrium, comparative static programming model provides estimates of impacts on the location, production, and prices of principal crops, commodity program participation, and the use of agricultural inputs, resulting from changes in resource constraints, prices, and policy parameters. USARM is data intensive and draws information from various sources. From time to time, the data underlying the model must be updated so that policy analysis results will reflect prevailing conditions. This report describes the procedures to construct and update the USARM data base. Data descriptions, sources, assumptions, and computational procedures used to merge and organize the data are explained in detail.

Keywords: Agricultural policy, mathematical programming, economic models

Acknowledgments

The authors wish to thank Tiajauna Sizemore for word processing and graphics preparation, and Bonnie Moore for editing the report.



1301 New York Avenue, NW.
Washington, DC 20005-4788

April 1993

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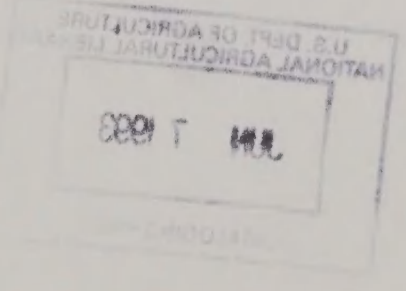

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Introduction

The U.S. Agricultural Resources Model (USARM) is a partial equilibrium, comparative static programming model designed to estimate the effects of changes in resource constraints, input prices, and policy parameters on the location, production, and prices of principal crops; commodity program participation; and the use of agricultural inputs. The model was developed in the Resources and Technology Division (RTD), Economic Research Service (ERS), U.S. Department of Agriculture, and is one of RTD's tools supporting ongoing research on agricultural policy and natural resource use. Since its creation in 1989, USARM has been used to analyze the national and regional effects of the Conservation Reserve Program (CRP), Wetlands Reserve Program options, greater commodity program flexibility, as well as other agricultural policy options.

The USARM model is data intensive, drawing information from various sources such as the National Agricultural Statistics Service (NASS), the Agricultural Stabilization and Conservation Service (ASCS), and the Farm Costs and Returns Survey (FCRS). The USARM encompasses nine crops (barley, corn for grain, cotton, hay, oats, rice, sorghum, soybeans, and wheat) and the CRP. The decision variables are 1) crop selection and acreage allocation, 2) production method (irrigation or dryland), and 3) participation and nonparticipation in the Federal commodity program. Market equilibrium is modeled by maximizing net social welfare subject to a set of resource and policy constraints. The data constitute the baseline of the model and are used to derive crop demand and supply curves, input-output coefficients, and resource constraints.

The model was based on 1987 commodity production levels, resource use, output and input prices, commodity program features, and 1987 CRP enrollment levels. The objective of this report is to explain the procedures used to construct and update the USARM data set to 1990 production and policy conditions. Updating the data periodically becomes necessary to reflect structural changes in production as well as changes in government programs and the general policy arena (for example, changes in farm legislation). Data description, sources, assumptions, and computer programs are documented in this report. The first five sections of the report explain the construction of five major blocks of data needed in the model: 1) crop acreage and yields (NASS), 2) program participation data (ASCS), 3) prices and deficiency payment data, 4) CRP data, and 5) cost of production and input use data (FCRS). The final section

explains how these data sets are merged and organized in order to generate the final USARM data set. Appendices are at the end of the report. The basic data set is organized at the State level. This data set can be modified for any level of geographical aggregation above the State level.

Harvested Acreage, Planted Acreage, and Crop Yields

The first block of information in USARM pertains to acreage and yield data corresponding to nine major crops. The main source of data is county crop estimates from NASS.[1] NASS information includes the following:

Commodity codes,
FIPS State codes,
FIPS county codes,
Crop year (1989-90),
Acres planted,
Acres harvested,
Irrigation codes, and
Yield per harvested acre.

A number of Statistical Analysis System (SAS) programs were developed to read and organize the NASS data set. For instance, NASS90.PRG creates nine data sets corresponding to the nine crops included in the USARM model. These data files are BARLEY.DAT, CORN.DAT, COTTON.DAT, HAY.DAT, OAT.DAT, RICE.DAT, SORGHUM.DAT, SOYBEAN.DAT, and WHEAT.DAT. A second SAS program, ALLNASS.PRG, merges the nine data sets and generates a new data set (NASS90B.OUT), which has the following table format:

Table 1--Sample illustration of NASS90B.OUT.

State code	Crop	Acreage				Yields		
		Planted (1)	Harvested (2)	Irrigated (3)	Dry (4)	Total (5)	Dry (6)	Irrigated (7)
.	Barley							
.	.							
.	Corn							
.	.							
.	Cotton							
.	.							
.	.							
.	.							

NASS90B.OUT does not contain all the information needed for USARM. For instance, some States do not report hay, cotton, or oats acreage. In addition, data on irrigated and dry acreage as well as dry and irrigated crop

[1]The data were provided on a diskette containing compressed files for individual crops (NASS 1989-90 county crop estimates). This diskette is available as ERS standard data product #92101, Brueggen, James, field crop county estimates [computer file], Washington, DC, NASS, March 1992.

yields are missing for several States. To complete the missing information in NASS90B.OUT, the following sources of data were used:

1) *Crop Production*--NASS, October 1991, total acreage and yield data for hay, cotton, and oats missing in the NASS diskette were obtained from this publication. The file containing this information is NASCROP.DAT.

2) *The 1987 Census of Agriculture*--The information obtained from the 1987 Census of Agriculture includes total crop acreage at the State level, as well as irrigated and dry acreage.[2] The program that reads and organizes this data set is CENSUS.PRG, which in turn creates CENSUS87.OUT.

The merging of NASS90B.OUT, NASCROP.DAT, and CENSUS87.OUT completes most of the information in columns (1) through (5) in table 1. In cases where NASS did not separately report irrigated acres, ratios of irrigated to dry land were derived from the census data and applied to NASS total figures. In cases where information was still missing, ratios of dry to irrigated land from the 1987 USARM data set were applied. These ratios are contained in NASS87.OUT.[3] A comparison of dry to irrigated ratios between 1987 and 1990 showed that these ratios have remained relatively constant.

Although NASS90B.OUT includes most of the data on irrigated and dry yields, a number of States are missing yield data for dry and irrigated crops. Crops identified as 100-percent dry or irrigated in a given State were assigned NASS total yield figures. For crops that were produced under both dry and irrigated conditions, we have no particular way to determine their corresponding yields. In the 1987 USARM, the 1984 Irrigation Production Data System (IPDS) was used to fill missing data on dry and irrigated yields.[4] Ratios of dry to irrigated crop quantities were obtained from IPDS and applied to 1987 NASS totals. This approach provided estimates of dry and irrigated crop quantities for 1987, which in turn were used to calculate dry and irrigated yields.

For the 1990 update, the most recent estimates of irrigated yields at the State and regional levels from the *Farm and Ranch Irrigation Survey of 1988* (FRIS) were used. This information is contained in IRR.DAT. FRIS reports irrigated yields and acreage figures for geographic and water resource areas. Not all of the States are represented in this data set. Because FRIS is based on the same sample as the 1987 Census of Agriculture, the missing irrigated yield information was obtained from published *1987 Census of Agriculture Reports* (CENIRR.DAT).[5] IRR.DAT and CENIRR.DAT were combined to obtain a

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[2]A diskette containing information on crop acreage by irrigated practices was provided by Joyce Su (ERS, 202-219-0490). Data from the 1987 Census of Agriculture are available on tapes from the National Computer Center, Kansas City, MO.

[3]The source of these data is NASS 1987-88 county crop estimates.

[4]IPDS is a 1984 irrigated data bank developed by Glen Schaible, ERS, at 202-219-0410.

[5]These reports are published for every State by the U.S. Department of Commerce, Bureau of the Census.

complete set of irrigated crop yields by States for 1988. Total yield and acreage figures for 1988 were collected from *Agricultural Statistics* and saved as ACRE88.DAT. The data sets IRR.DAT, CENIRR.DAT, and ACRE88.DAT were merged to create a file containing total yield and acreage, as well as irrigated yields for 1988 (FRIS88.OUT).

Holding *Agricultural Statistics* data as control totals, the basic procedure used to complete missing data on dry and irrigated yields for 1990 is as follows: 1) estimate crop quantities (total, dry, and irrigated) by using FRIS88.OUT and by assuming that the proportion of dry and irrigated acreage was the same for both 1988 and 1990, 2) apply the proportion of dry and irrigated crop production in 1988 to total crop output in 1990, and 3) obtain irrigated and dry yields in 1990 by dividing respective acreage into respective output quantities. In a few cases, this approach resulted in dry/irrigated yields that were either too high or too low relative to yield figures used in USARM 1987. This may be due to the fact that FRIS and NASS estimates are drawn from two different years. Hence, irrigated yields in FRIS correspond to acreage and production levels that may differ from those reported in NASS. Observations with unreasonable yield figures were adjusted within the SAS program NASSF.PRG by using the proportion of dry-to-irrigated yields from the 1987 USARM data set.

The first block of data for the USARM was completed after making the adjustments mentioned above. The SAS file containing all of the statements for data manipulation is NASSF.PRG (see Appendix B). Figure 1 shows the data sets that are read by FINAL90.PRG and the final data set generated with this program. The basic features of NASSF.PRG are as follows:

- Read NASS90B.OUT, CENSUS87.OUT, NASCROP.DAT, FRIS88.DAT, and NASS87.OUT making appropriate adjustments for units of measure.

- Merge the above data sets, create dry/irrigated ratios, and define conditional "if-then" statements to allocate dry and irrigated acreage. This completes columns (1) through (5) in table 1.

- Create statements to determine 100-percent irrigated or dry yields.

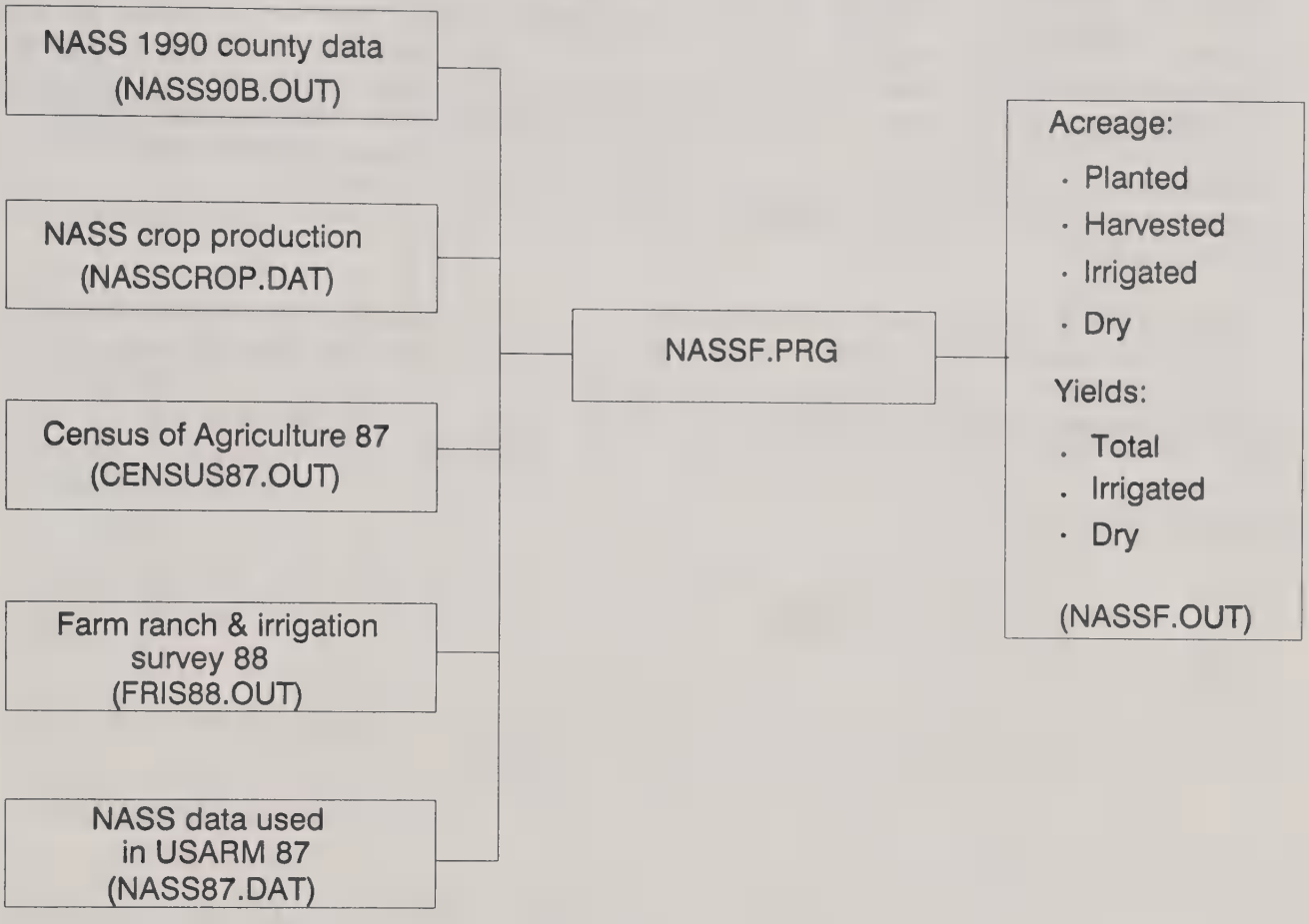
- Complete missing information on dry and irrigated yields by using quantity ratios from FRIS.

- Compare data with 1987 figures and make corrections using 1987 dry/irrigated yield information.

- Set the data according to irrigation practices and create a dry/irrigation code.

- Create NASSF.OUT, which contains the variables "acres" and "yield" and are sorted by crop, State FIPS, and irrigation practice. This data set will be merged with other USARM data sets (for example, ASCS and FCRS).

Figure 1 Crop acreage and yield data



Data on Government Program Participation

An important feature of the USARM is modeling of farmers' participation or nonparticipation in Federal commodity programs. ASCS compliance reports are used to obtain these data. For this reason, the following detailed data are needed.

- Crop base held by participating farmers (net of CRP acreage),
- Effective Acreage Reduction Program acres,
- 1990 intended planting,
- Conserving use acreage for payment,
- 8-percent conserving use acreage,
- Total 0-92/50-92 program acreage,
- Deficiency payment acreage,
- Established yields,
- Program yields, and
- Planted acreage for grain and cotton.

The ASCS data set containing variables that are needed in the USARM is found in FARMALL.DAT.[6] ASCS_A.PRG reads FARMALL.DAT and organizes the data in the same format as in the other USARM data sets (such as NASSF.OUT). The new data set generated with this program is ASCS90.OUT, which is shown in figure 2.

There are several shortcomings of ASCS90.OUT. First, the base acreage figures represent crop base acreage on complying farms only. Second, planted acreage figures are not reported as irrigated and dry acreage, as required in USARM. To obtain the total base representing the base acreage for both complying and noncomplying farms, percentage compliance figures available in *NEWS USDA* (Office of Public Affairs, 7/12/91) were used. The base acreage information is saved as PCTBASE.DAT. Dry and irrigated planted acreage as well as program yields were obtained from ASCS's 1989 records.[7] These data are contained in DRYIRR90.DAT.

The ASCS data set gives information on planted acreage, but not harvested acreage as needed for USARM. To obtain harvested acreage for participating farmers, failure rates were calculated using the NASS data set (NASS90B.OUT). Failure rates were defined as the ratio of harvested to planted acreage and applied to total ASCS planted acreage. As shown in figure 2, the program that organizes the ASCS data is ASCSF.PRG (Appendix C). The basic features of this program are the following:

- Merge ASCS90.OUT, DRYIRR90.DAT, PCTBASE.DAT, and DRYIRR87.DAT (DRYIRR87.DAT contains dry/irrigated ratios from the 1987 USARM data set).
- Define variables and create ratios to determine total base as well as irrigated and dry planted acreage.
- Set the data for dry and irrigated acreage and define an irrigation code.
- Read the 1987 ASCS data set (ASCS87.OUT) and match the 1990 data according to the 1987 USARM format.
- Read NASS90B.OUT and calculate ASCS harvested acreage, using failure rates from NASS.
- Create ASCSF.OUT to be merged with other USARM data sets.

Crop Prices and Deficiency Payment Data

Figure 3 depicts the block of information related to crop prices, loan rates, and deficiency payments. Regional market prices at the State level for the nine crops included in the model were obtained from:

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[6]Farm compliance report files were provided by Brad Karmen (202-720-4146) and Alex Barbarika (202-720-7093) in ASCS/USDA. The original ASCS data come in several Lotus files.

[7]This information was provided by Alex Barbarika (ASCS, 202-720-7093).

Figure 2 Farm program participation data

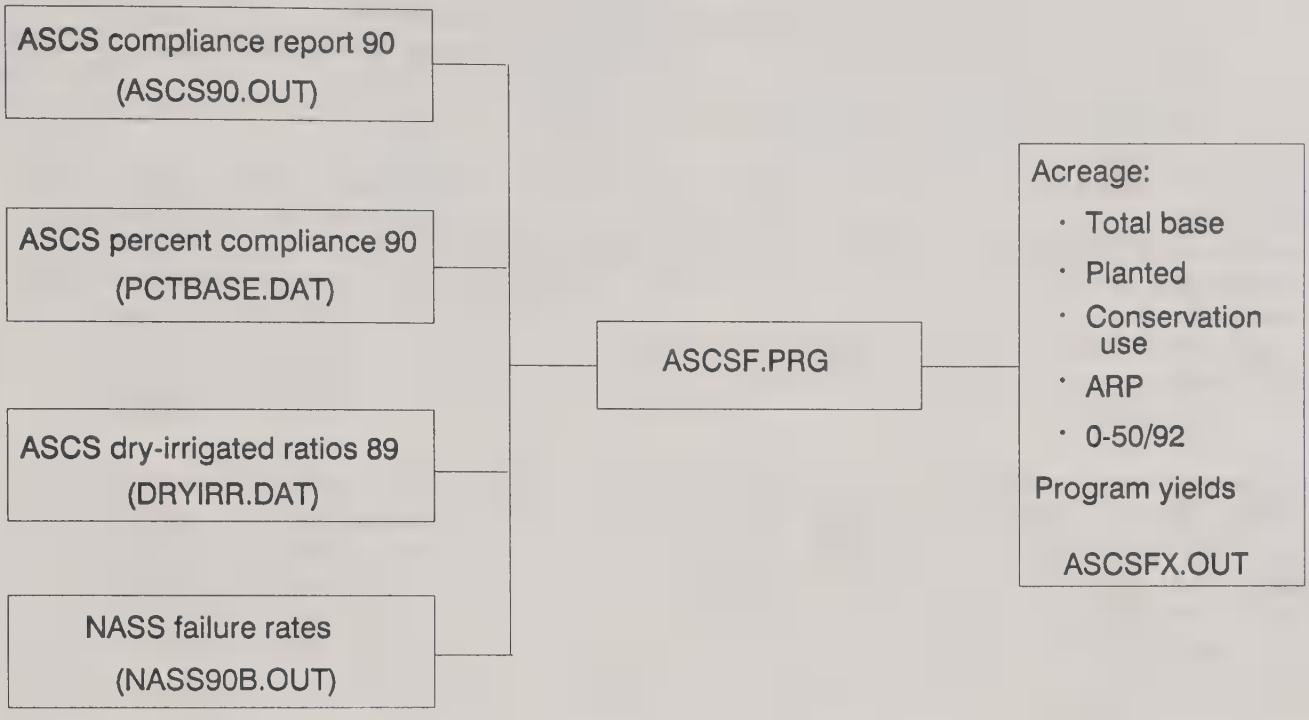
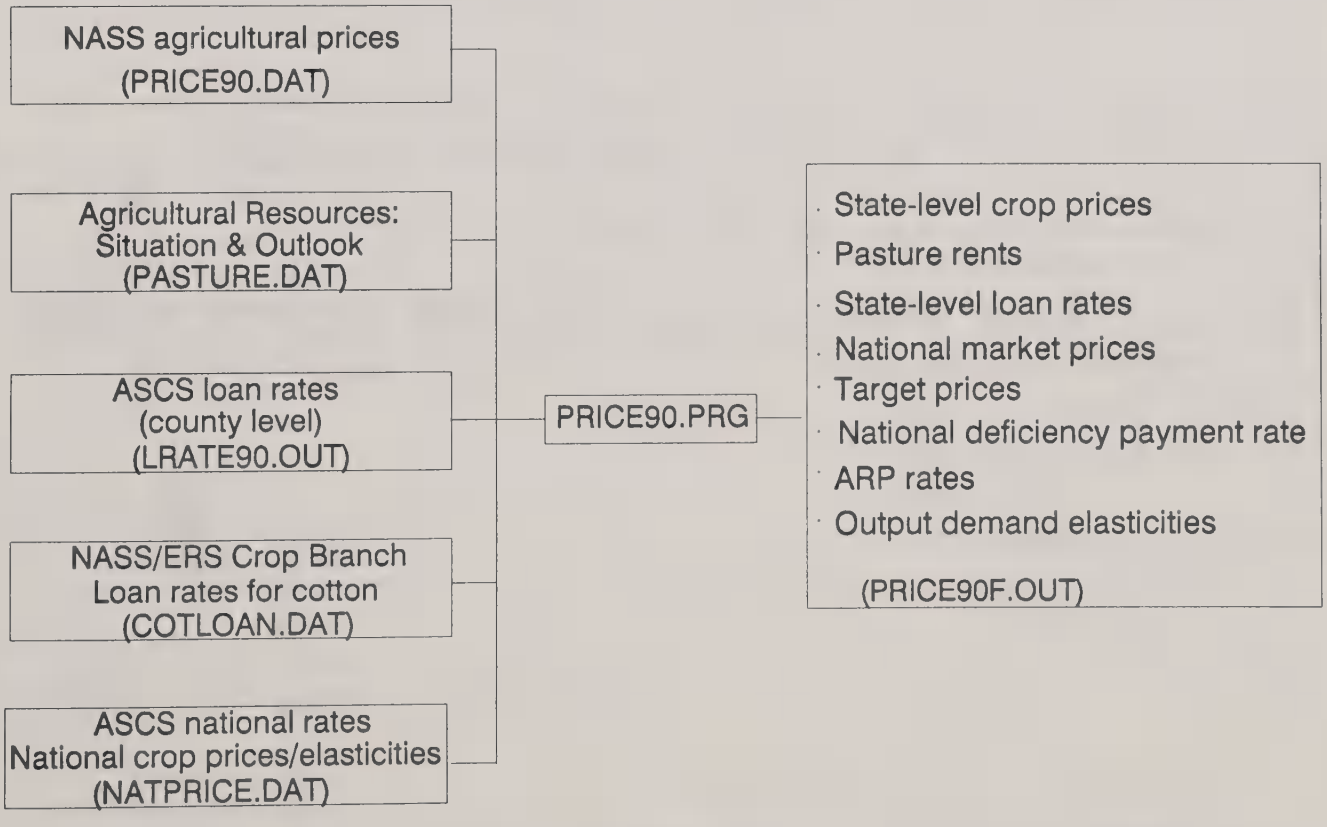


Figure 3 Crop prices, loan rate, and deficiency payment data



- *Agricultural Prices 1990 Summary*, USDA/NASS, June 1991,
- *Rice: Situation and Outlook Report*, USDA/ERS, Oct. 1991,
- *Wheat: Situation and Outlook Report*, USDA/ERS, Nov. 1991, and
- *Cotton and Wool: Situation and Outlook Report*, USDA/ERS, Nov. 1991.

The above information is saved as PRICE90.DAT.

County-level loan rates were obtained from ASCS for barley, corn, oats, sorghum, soybeans, and wheat.[8] These figures were weighted by NASS county-level crop acreage to arrive at State-level estimates. The weights are saved in WEIGHT1.OUT and State-level loan rates are contained in LRATE90.OUT. Loan rates for rice and cotton were also obtained from ASCS.[9] The loan rate for rice is the same across States, while the loan rates for cotton correspond to the base quality rate in each State. Rice and cotton loan rates data are saved in COTLOAN.DAT.

National-level market prices, target prices, loan rates, and ARP rates were obtained from ASCS.[10] These figures are also available in several ERS/USDA publications (for example, *Provisions of the Food, Agriculture, Conservation, and Trade Act of 1990)*. Crop demand elasticities are estimated by Robert Green and are used in the 1987 USARM model.[11] These elasticity estimates have not been revised since 1987. The file containing national-level market and target prices, loan and ARP rates, and crop demand elasticities are saved in NATPRICE.DAT.

Pasture rents at the State level are used in the USARM to ensure that farm profits are not negative. Pasture rents were obtained from *Agricultural Resources: Situation and Outlook Report*, USDA/ERS, June 1991, and the file containing these data is PASTURE.DAT. For States without pasture rent data, these rents are assumed to be the same as those in neighboring States.

As shown in figure 3, PRICE90.PRG combines the data sets mentioned above (Appendix D). The program first merges data on regional market prices with pasture rents. These data are common to both participating and non-participating farmers. These data are combined with information that applies to participating farmers only (for example, State-level loan rates). This step requires defining a program participation code such that regional and national prices are assigned to participating and nonparticipating farmers, while loan rates, target prices, and deficiency payment rates are defined for participating farmers only. This procedure doubles the number of observations in the data set. The final data set created with this program is PRICE90F.OUT.

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[8]These rates were provided by Tim Murray (ASCS, 202-720-6125).

[9]To obtain cotton loan rates, call Janise Zygmont or Carol Scaly (ASCS, 202-720-6734). Rice loan rates were provided by Eugene Rosera (ASCS, 202-720-6734).

[10]Brad Karmen (ASCS, 202-720-4146)

[11]Robert Green (ERS, 202-219-0689).

Data on the Conservation Reserve Program (CRP)

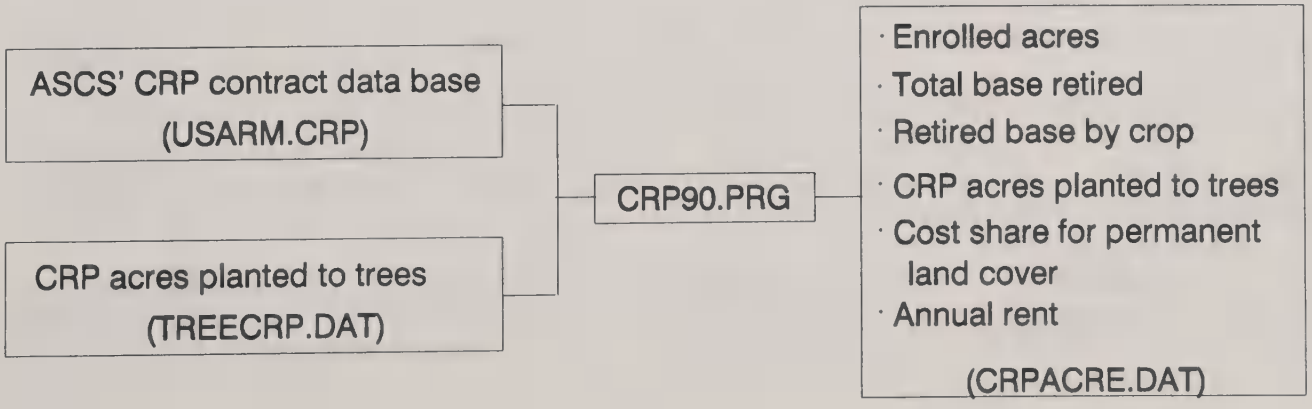
For purposes of the USARM, CRP acreage is treated as another crop. Farmers can either allocate land to the nine crops included in the model or place land under CRP. Hence, land allocation to CRP is a choice variable for farmers in response to relative crop prices and CRP annual land rents. The basic CRP data are saved in USARM.CRP, which includes the following information:[12]

- State FIPS,
- Code for participation in commodity programs,
- Total acres of retired base,
- Acres of retired base by crops,
- Acres enrolled in CRP as of 1990 by State by participation status,
- Lump sum cost share (for maintenance cost), and
- Annual rent in dollars per acre.

In addition, information on CRP acres planted to trees is saved in TREECRP.DAT. As shown in figure 4, the TREECRP.DAT is merged with USARM.CRP, using CRP90.PRG (Appendix E). Because CRP is a cropland retirement program, it is assumed that CRP acres are not irrigated. Thus, an irrigation code is created and set equal to zero. The variables defined in this program are CRP acres, regional annual rental rates, maintenance cost shares, and acres planted to trees. The data are already stratified by deficiency payment program participation. CRP90.PRG generates CRPACRE.DAT, which is the final data set to be merged with the other USARM data sets.

In return for CRP benefits, participating farmers must reduce the crop acreage base by an amount equivalent to the ratio of CRP acres to total farm crop acres. Retired crop acreage base, by crop, is specified in a table within the GAMS program that generates the USARM. The program that generates this table (CRPCB.PRG) is explained later in this document.

Figure 4 Conservation Reserve Program data



[12]CRP data were provided by Tim Osborn (ERS, 202-219-0403) based on the ASCS CRP contract data base.

Cost of Production and Input Use Data

Input prices and quantities constitute the fifth block of data in USARM. Factor inputs with physical use and regional price data in the model are seed, nitrogen, phosphate, potash, lime, sulfur, trace minerals, water, manure, irrigation water, and hired labor. In addition, factor inputs with per-acre cost data are herbicides, fungicides, defoliants, insecticides, drying and ginning, custom applications, fuel and electricity, repairs, technical services, taxes and insurance, interest, capital replacements, overhead, and family labor. The primary data source is the Farm Costs and Returns Survey (FCRS).

FCRS collects enterprise cost data for specific crops on a 4-year rotating cycle (for example, barley, cotton, and corn were surveyed in 1987 and 1991, whereas wheat, soybeans, sorghum, and rice were surveyed in 1986 and 1990). ERS uses computerized budget generators to calculate annual cost of production estimates. In the past, this budget generator was based on the Firm Enterprise Data System (FEDS). The 1987 USARM was based on data generated by FEDS. However, ERS has discontinued the use of FEDS and has developed a farm-level budget generator to produce national and regional cost estimates. The new system is supposed to be more efficient and consistent than the old one. At the time of this report, only soybean and sorghum data existed under the new system.

The new ERS budgets are not compatible with budgets generated by FEDS because they are different in design. Thus, combining data from the two systems may not be appropriate when updating the USARM data set. Until cost and return data for all crops become available, some criteria must be applied to update the data. The provisional procedure followed in this version of the model was to update prices per unit of input, using cost of production indices from NASS, and to assume that input use per acre has remained the same. This approach is followed by ERS to update cost and return data between survey years.[13] Figure 5 shows the possible sources of data that can be used to generate factor prices and quantities for USARM. The program that generates the final FCRS data set is FCRS90.PRG (Appendix F).

The Final USARM Data Set

The previous sections focused on the construction of individual blocks of data. Figure 6 illustrates how these different blocks of data are linked and merged to arrive at the final USARM data set. This process is performed using the SAS program FINAL90.PRG (Appendix G).

The first part of FINAL90.PRG merges NASSF.OUT and FCRSF.OUT. Acreage and yield data are combined with factor prices and quantities to generate a data set *A* (temporary within the SAS program). A simplified representation of the data at this stage is shown as table 2.

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[13]The possibility of using a number of different data sources (such as recent water quality surveys, objective yield summaries, and NASS/ERS chemical usage reports) needs to be explored.

Figure 5 Cost of production and input use data

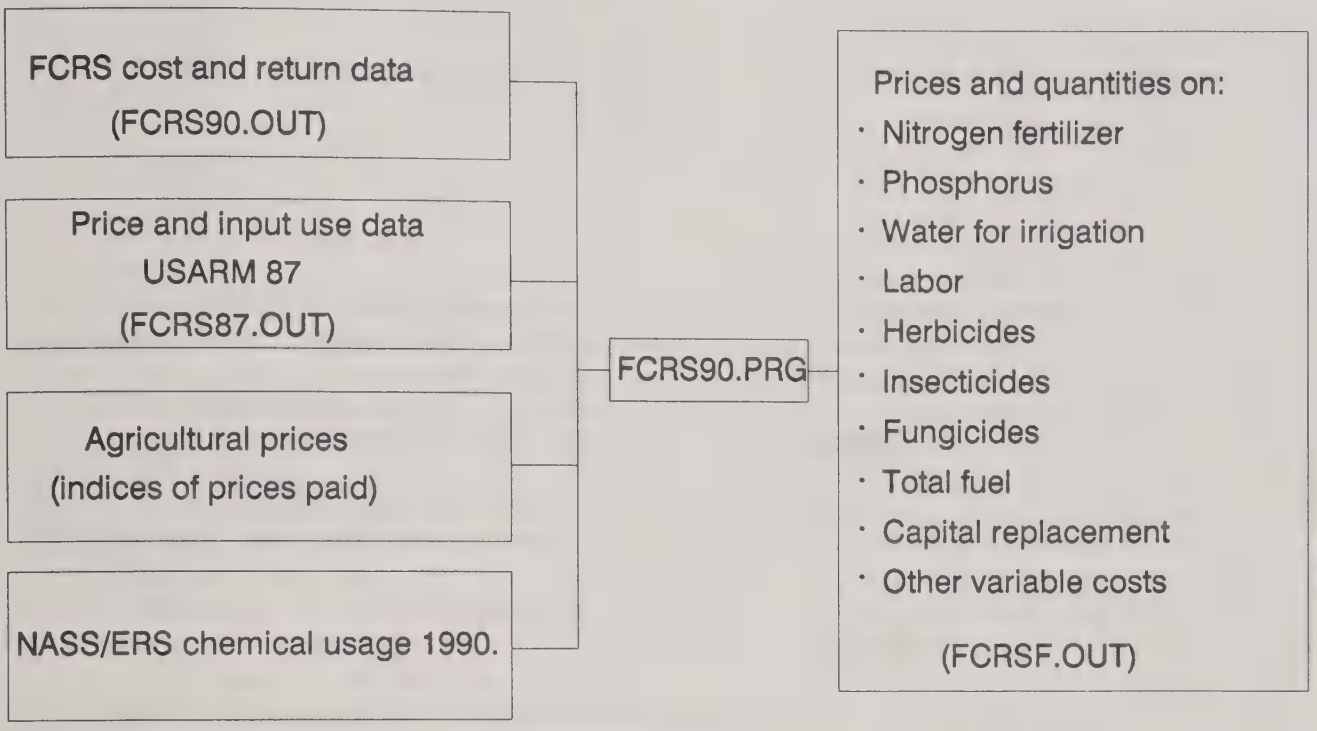

Figure 6 Construction of the USARM data set

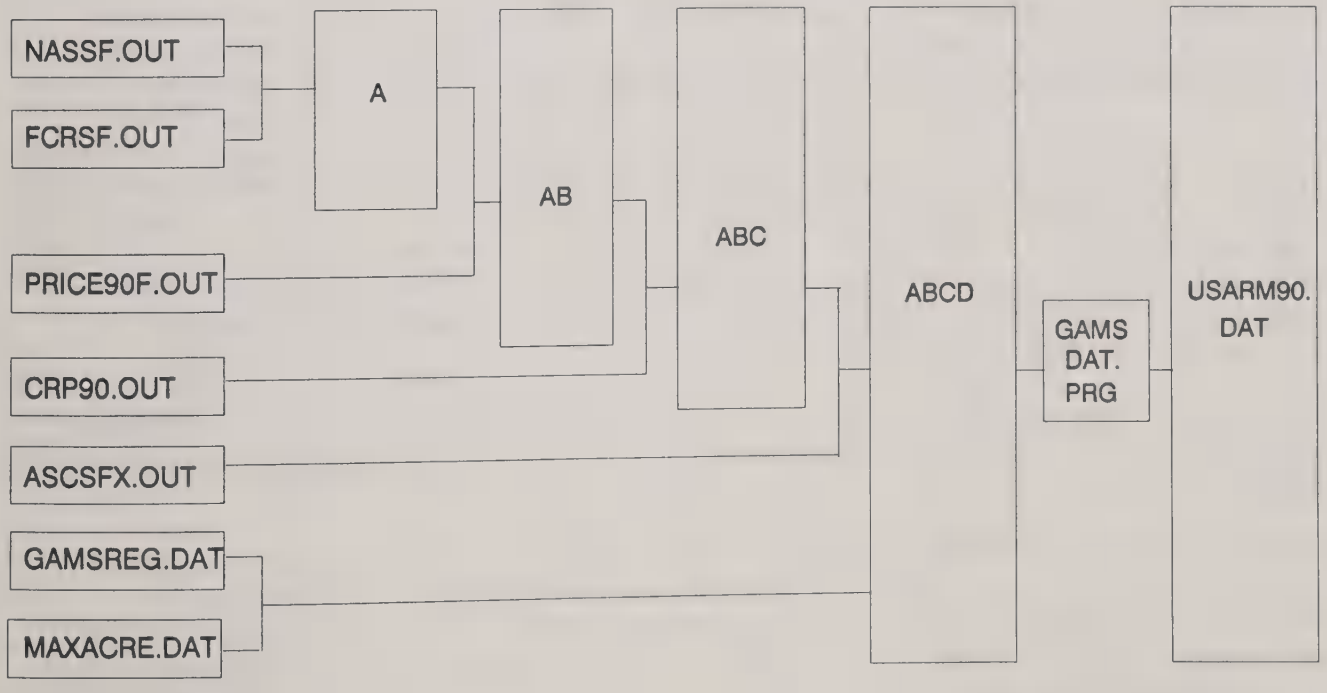

Table 2--Sample illustration of data set A.

State code	Crop	Irrigation code	Harvested acreage	Crop yield	Factor price	Factor quantities
ST1	CROP1	IRR	X	X	X	X
ST1	CROP1	DRY	X	X	X	X
ST1	CROP2	IRR	X	X	X	X
ST1	CROP2	DRY	X	X	X	X
.	.	.	.	.	.	.

These data are sorted by crop, irrigation code (irr/dry), and State FIPS. Total per-acre costs are defined as the sum of expenditures on nitrogen, phosphate, water, labor, herbicides, insecticides, fungicides, fuel, capital replacement, other fertilizer costs (potash, lime, manure, sulphur, and trace), and "other variable costs" (seed, custom, repairs, ginning, technical services, overhead, taxes, interest, insurance, and miscellaneous).

The second part of the program reads the data set PRICE90F.OUT (crop prices, loan rates, and deficiency payments). Unlike the NASS/FCRS data, PRICE90F.OUT includes a program participation code. A temporary data set is created from PRICE90F.OUT that deletes all the observations associated with program participation. These data are then merged with *A* to organize a program nonparticipation budget data *NPRGBDG*. A similar procedure is used to generate a program participation budget data *PRGBDG*. In this case, the observations associated with program nonparticipation are deleted from PRICE90F.OUT. The data sets NASSF.OUT and FCRSF.OUT are then stacked (one on top of the other) as an intermediate step to accommodate acreage, yields, and factor prices and quantities for program participation and program nonparticipation. This temporary data set within the SAS program is called *AB*.

The next step in FINAL90.PRG is to add the CRP data. As explained earlier, the acreage data for CRP is already stratified between participating and nonparticipating farmers, CRP is treated as another crop, and the rental price represents the regional market price for crops. Lump sum CRP cost shares are defined as other variable costs, and these costs are divided by 10 (the number of years of a CRP contract), and then $7 is added to represent maintenance costs. Loan rates, national market prices, and Acreage Reduction Program (ARP) rates are not applicable to CRP. These variables are set equal to zero. CRP yield is set equal to 1 to allow calculation of per-acre profit figures. Adding CRP information to the *AB* data set gives the set *ABC* in the SAS program. A sample of the data at this stage is shown as table 3.

Except for CRP, harvested acreage (X^*) at this stage represents total (NASS) crop acreage and not actual acreage for participating and nonparticipating farms.

The next step in FINAL90.PRG reads the ASCSFX.OUT data. Net base acreage is defined as total base minus 0-92/50-92 program acreage. The program participation code is set equal to 1 because these data correspond only to deficiency payment farmers. The ASCS data are merged with *ABC*, generating the expanded data set *ABCD*.

Table 3--Sample illustration of data set ABCD.

State code	Crop	Program code	Irrigation code	Harvested acreage	Regional price	Loan rate	Deficiency payment	Total cost per acre
ST1	CROP1	P	IRR	X*	X	X	X	X
ST1	CROP1	P	DRY	X*	X	X	X	X
ST1	CROP1	N	IRR	X*	X	0	0	X
ST1	CROP1	N	DRY	X*	X	0	0	X
.	.	.	.	.	.	.	.	.
ST1	CRP	P	DRY	X	X	0	0	X
ST1	CRP	N	DRY	X	X	0	0	X

The correct crop acreage for participating and nonparticipating farms is defined at this level. Hay and soybeans are not included in the deficiency payment program. Thus, these crops are assigned a program participation code of zero. For program participation and for crops other than CRP, crop acreage is set equal to ASCS harvested acreage. Because NASS figures represent total harvested acreage, the correct acreage for nonparticipating farms is the difference between NASS and ASCS harvested acres. Program yields, base acreage, ARP acreage, and 0-92/50-92 acreage are defined for program participation, but set equal to zero for program nonparticipation. At this point, the data set for USARM is completed. A sample of the data takes the form shown in table 4.

The consistency of the data can be evaluated at this stage. In some instances, ASCS reports more harvested acres than NASS. Because NASS county estimates are based on ASCS data, possible errors may have resulted if NASS figures were subsequently revised by ASCS. To correct this problem, the following procedure is applied: if acres for nonparticipating farms are less than zero, then these farms are assigned 1,000 acres. However, if harvested acres for participating farms are greater than NASS acres, harvested acres for these farms are set equal to NASS harvested acreage minus the 1,000 acres assigned to nonparticipating farms. Crop acreage in the USARM is expressed in thousands (for example, 1=1,000 acres). This approach basically assigns one unit of acreage to one group and takes out another unit from the other group, leaving total NASS figures unchanged.

Table 4--Sample illustration of data set USARM90.DAT.

State code	Crop	Program code	Irrigation code	New harvested acreage	Regional prices	Loan rate	Program yield	Factor prices	Base acreage
ST1	CROP1	P	IRR	X	X	X	X	X	X
ST1	CROP1	P	DRY	X	X	X	X	X	X
ST1	CROP1	N	IRR	X	X	0	0	X	0
ST1	CROP1	N	DRY	X	X	0	0	X	0
.	.	.	.	.	.	.	.	.	.
ST1	CRP	P	DRY	X	X	0	0	0	0
ST1	CRP	N	DRY	X	X	0	0	0	0
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.

Another consistency check is to evaluate whether profits are positive or not. Profits per acre are defined as

$$piH = y*p - c.$$

Where y, p, and c represent crop yield, crop prices, and total cost per acre. If profits are negative or less than pasture rents, the cost figures need to be modified to ensure positive profits. This procedure involves reducing other variable costs by the difference between pasture rents and profits. Total costs and profits are recalculated using the new other variable costs. Hence, pasture rents are a lower bound for per-acre profits.

The data set *ABCD* contains the basic information needed in the USARM. In addition to having a State FIPS code, it is useful to introduce different geographical codes to facilitate identification, interpretation, and aggregation or disaggregation of the data. GAMSREG.DAT contains codes for the 10 USDA farm production regions, the original USARM regions, and individual States. Also, maximum harvested acreage information (contained in MAXACRE.OUT) is added to the data. This information is used to set maximum historical acreage constraint in the USARM, and the data represent the maximum historical crop acreage of the past 30 years for a given State, as reported by NASS in *Agricultural Statistics*. The merging of *ABCD*, GAMSREG.DAT, and MAXACRE.OUT completes all of the required information in USARM.

The final data set (USARM90B.OUT) is generated at the end of the FINAL90.PRG, using the "PUT" statement in SAS. The USARM90B.OUT can be read with other SAS programs and can be used for comparisons with the 1987 data set or to aggregate the data for different regional levels.

The GAMS Data Set[14]

The final data set to be used in the USARM is organized with the program GAMSDAT.PRG (Appendix H). This program includes statements for data aggregation and puts the data in a format that can be read by GAMS.

The key variables used for aggregating data are the State name, STNAME (AL,...,WY), and the State code GAMSST (S-AL,...,S-WY). GAMSST is the variable that defines the region in the model. The MEAN procedure in SAS is used to obtain weighted averages for input prices and quantities, output prices, loan rates, and crop yields. The weight for every State is crop acreage. On the other hand, the SUM option is used to aggregate crop acreage, base acreage, maximum acreage, and CRP acreage planted to trees.

The program specifies a number of if-then statements linking the variables STNAME and GAMSST. If the objective is to generate a data set at the State level, then the assignment statements should be treated as comments. On the other hand, if one wants to generate a data set according to the USARM87 regions, only one statement is needed that sets GAMSST equal to GAMSREG (GAMSST=GAMSREG). The MEAN procedure in SAS generates a weighted average of input prices and quantities, crop yields, crop prices, and loan rates (by participation code, crop, irrigation code, and GAMSST). This step generates a

---

[14]GAMS stands for General Algebraic Modeling System. The USARM is written in GAMS.

temporary data set *DATA1*. The SUM procedure, in turn, adds crop acres, base acres, maximum acres, and CRP acres planted to trees using the same sorting procedure. A temporary data set *DATA2* is created at this stage. The merging of *DATA1* and *DATA2* results in a new data set having the desired level of aggregation. To create a data set using the 10 farm production regions, set GAMSST equal to FEDREG. Any other level of aggregation is possible by setting GAMSST equal to a new regional code. However, because the new codes will not be in the data set, one needs to specify these codes for every State (for example IF STNAME='AL' THEN GAMSST=R-NEW1).

An additional step in the program is to define a code number for crops (for example, IF CROP=BAR THEN CROPNUM=1,....,etc). The final step in the program is to use the PUT statement to generate a data set that resembles the GAMS table format. The output generated with the "PUT" statement looks like:

P.I.BAR.S-AL X_1 X_2.....X_m P.I.BAR.S-AL X_{m+1} .....X_n
P.I.BAR.S-CA X_1 X_2.....X_m P.I.BAR.S-CA X_{m+1}.....X_n

where P, I, BAR, and S-AL correspond to participation (PART), irrigation (IRR), crop (CROP), and regional (R) codes. X_1 to X_n are all the variables in the data set. To organize the data in the table format needed in GAMS, one needs to rearrange the data set.[15] The final table should look like the following:

```
      TABLE PP(PART,IRR,CROP,R,*)   PRODUCTION INPUT-OUTPUT TABLE
                ACRE YIELD.............................   LABP
  P.I.BAR.S-AL  X1  X2.....................................Xm
  P.I.BAR.S-CA  X1  X2.....................................Xm
      .         ..........................................
 +              BASE  ..... .....................   MAXACRE
  P.I.BAR.S-AL  Xm+1..... ..............................Xn
  P.I.BAR.S-CA  Xm+1..... ..............................Xn
      .         ........... ............................
```

Two additional tables are needed in the USARM. The first one refers to commodity demand data.

```
      TABLE DEMAND(CROP,*) COMMODITY DEMAND DATA
            PRICE      TARGET_P     DEFPAY    LOAN_R    ELAS
      BAR     X           X          X         X         X
      COR     X           X          X         X         X
       .      .           .          .         .         .
       WHE    .           .          .         .         .
```

The information in this table is the same as that contained in NATPRICE.DAT.

The second table refers to base acreage retired in CRP. The table has the following form:

```
          TABLE CRPCB(R,CROP)  BASE ACRES RETIRED IN CRP
             BAR     COR     COT     RIC     WHE     SOR     OAT
      S-AL    X       X       X       X       X       X       X
      S-CA    X       X       X       X       X       X       X
       .      .       .       .       .       .       .       .
```

---

[15]This has been done using KEDIT, which is an ASCII editing software package.

This table should be consistent with the level of aggregation of the input-output table. The SAS program that generates CRP data with the required level of aggregation is CRPCB.PRG (Appendix I). This program reads USARM.CRP and GAMSREG.DAT. After merging these data sets, the regional assignment statements applied in GAMS90.PRG are also used in CRPCB.PRG. The SUM procedure in SAS adds across States the base acreage retired for each crop. The three tables presented above are the ones used in the USARM.

In conclusion, this report describes the procedures used to construct the data base for the USARM. Data description, sources, assumptions, and computational procedures used to merge and organize data are explained in detail. This report is designed to accompany another report documenting the structure of USARM expected in the spring of 1993, and serves as reference for updating USARM data in the future.

References

U.S. Department of Agriculture. *Agricultural Statistics.* Various issues.

U.S. Department of Agriculture, Economic Research Service. *Agricultural Resources: Agricultural Land Values and Markets Situation and Outlook Report.* June 1991.

U.S. Department of Agriculture, Economic Research Service. *Cotton and Wool: Situation and Outlook Report.* Nov. 1991.

U.S. Department of Agriculture, Economic Research Service. *Provisions of the Food, Agriculture, Conservation, and Trade Act of 1990.* AIB-624. June 1991.

U.S. Department of Agriculture, Economic Research Service. *Rice: Situation and Outlook Report.* Oct. 1991.

U.S. Department of Agriculture, Economic Research Service. *Wheat: Situation and Outlook Report.* Nov. 1991.

U.S. Department of Agriculture, National Agricultural Statistics Service. *Agricultural Prices 1990 Summary.* June 1991.

U.S. Department of Agriculture, National Agricultural Statistics Service. *Crop Production.* Oct. 1991.

U.S. Department of Agriculture, Office of Press and Media Relations. *NEWS.* July 12, 1991.

U.S. Department of Commerce. *Census of Agriculture Report-1987.* Various States.

U.S. Department of Commerce. *Farm and Ranch Irrigation Survey-1988.*

Appendix A: Units of Measure

Crops	NASS yields	Regional prices	National prices	USARM87 model
Barley	Bushels/acre	$/bu	$/bu	$/bu
Corn	Bushels/acre	$/bu	$/bu	$/bu
Cotton	Pounds/acre	$/cwt	$/lb	$/lb
Hay	Tons/acre	$/ton	$/ton	$/ton
Oats	Bushels/acre	$/bu	$/bu	$/bu
Rice	Cwt/acre	$/cwt	$/cwt	$/bu
Sorghum	Bushels/acre	$/cwt	$/bu	$/bu
Soybeans	Bushels/acre	$/bu	$/bu	$/bu
Wheat	Bushels/acre	$/bu	$/bu	$/bu

Inputs	Input use	Price
Nitrogen fertilizer	Lbs/acre	$/lb
Phosphate	Lbs/acre	$/lb
Irrigation water	Acre feet/acre	$/acre foot
Labor	Hours/acre	$/hour
Herbicides	Expenditure/acre	
Insecticides	Expenditure/acre	
Fungicides	Expenditure/acre	
Total fuel	Expenditure/acre	
Capital replacement	Expenditure/acre	
Other variable costs	Expenditure/acre	

APPENDIX B: NASSF.PRG

```
**************************NASSF.PRG************************;
*********************ACREAGE AND YIELD DATA*****************;
** The objective of this program is to organize the data for;
** acres, yields, and crop production in 1990;
** NASS is the basic source of information for;
** planted and harvested acres and yields, stratified by;
** irrigation practices (dry/irrigated);
** The output of this program is NASSF.OUT;

OPTIONS LINESIZE=132;
DATA NASS90;

 INFILE 'D:\RICARDO\NASS90\NASS90B.OUT' PAD;
  INPUT STFIPS CROP $ TPACRE THACRE DPACRE DHACRE IPACRE IHACRE
        TYLD DYLD IYLD;


  NASACRE=THACRE/1000;
  NASDRY=DHACRE/1000;
  NASIRR=IHACRE/1000;
  NASYLD= TYLD;
  NASDYLD= DYLD;
  NASIYLD= IYLD;

**IF CROP='HAY' THEN NASYLD=NASYLD/100;
  PROC SORT DATA=NASS90; BY CROP STFIPS;

**The agricultural census for 1987 is used to supplement the NASS data set;
**whenever there is missing information on irrigated/dry acreage;

DATA CENSUS87;
  INFILE 'D:\RICARDO\NASS90\CENSUS87.OUT' PAD;
  INPUT STFIPS CROP $ CENACRE CENIRR CENDRY CENYLD;
  IF CENACRE=0 THEN DELETE;
  CENACRE= CENACRE/1000;
  CENIRR= CENIRR/1000;
  CENDRY= CENDRY/1000;
  PROC SORT; BY CROP STFIPS;



***NASS90B.OUT does not include information on ;
***some States for which there is significant acreage;
***(for example South Carolina for cotton) and several other States;
***for hay and oats. The next data set (NASCROP) is used to complete;
***missing information. These figures are taken from Crop Production;
*** NASS, Oct. 1991.;

DATA NASCROP;
 INFILE 'D:\RICARDO\NASS90\NASCROP.DAT' PAD;
  INPUT STNAME $ STFIPS NASACRE NASYLD CROP $;
  PROC SORT DATA=NASCROP; BY CROP STFIPS;
```

```
***The 1987 NASS data set (USARM 87) is used for comparison and to help;
***fill gaps in the 1990 data.

DATA KAZIM;
  INFILE 'D:\RICARDO\NASS90\KAZACRE.DAT' PAD;
  INPUT STFIPS CROP $ KAZACRE KAZDRY KAZIRR KAZYLD KAZDYLD KAZIYLD;
  IF KAZIRR='.' THEN KAZIRR=0;
  IF KAZDRY='.' THEN KAZDRY=0;
  KAZACRE= KAZIRR + KAZDRY;
  KPCTIRR= KAZIRR/KAZACRE;
  KPCTDRY= KAZDRY/KAZACRE;
  KAZDQ= KAZDRY*KAZDYLD;
  KAZIQ= KAZIRR*KAZIYLD;
  KAZQ= KAZDQ+KAZIQ;
  DRYQPERC= KAZDQ/KAZQ;

  PROC SORT DATA=KAZIM; BY CROP STFIPS;

**This data step introduces State names to facilitate data analysis;

DATA STNAME;
  INFILE 'D:\RICARDO\NASS90\STNAME.DAT' PAD;
  INPUT STFIPS STNAME $ CROP $;

**Farm and Ranch Irrigation Survey 1988 (FRIS) provides the latest;
**estimates for irrigated yields for several States and;
**water resource areas;

DATA FRIS88;
  INFILE 'D:\RICARDO\NASS90\FRIS88.OUT' PAD;
  INPUT STFIPS CROP $ STNAME $ ACRE88 TYLD88 IACRE88 IYLD88;
  PROC SORT DATA=FRIS88; BY CROP STFIPS;

**##########################################################;
**Merge all of the data sets and begin generating statements;
**to create acreage information for dry and irrigated crops;

DATA MERGEB1;
 MERGE CENSUS87 NASS90 NASCROP KAZIM FRIS88; BY CROP STFIPS ;
 IF STFIPS=0 OR STFIPS=2 OR STFIPS=15 THEN DELETE;

 IF CENDRY='.' THEN CENDRY=0;
 IF CENIRR='.' THEN CENIRR=0;
 CENACRE=CENDRY+CENIRR;
 IF CENACRE='.' THEN CENACRE=0;
 PERCIRR=CENIRR/CENACRE;
 OURIRR=NASACRE*PERCIRR;
 OURDRY=NASACRE-OURIRR;

IF NASACRE='.' THEN DELETE;
 IF STFIPS=20 AND CROP='COT' THEN DELETE;
 IF STFIPS=51 AND CROP='COT' THEN DELETE;

IF NASDRY='.' AND NASIRR='.' AND CENACRE= 0
    THEN NASDRY=NASACRE*KPCTDRY ;
```

```
IF NASIRR='.' AND CENACRE= 0 THEN NASIRR=NASACRE*KPCTIRR;

 IF NASDRY='.' AND NASIRR='.' AND CENACRE>0 AND CENACRE=CENDRY
    THEN NASDRY=NASACRE;

IF NASDRY='.' AND NASIRR='.' AND CENACRE>0
          AND CENACRE=CENIRR THEN NASIRR=NASACRE;
IF NASIRR='.' AND OURIRR>0 THEN NASIRR=OURIRR;
IF NASDRY='.' AND OURDRY>0 THEN NASDRY=OURDRY;
IF CROP='COR' AND STFIPS=56 THEN NASDRY=0;
IF CROP='WHE' AND STFIPS=12 THEN DO;
     NASDRY=NASACRE;
     NASIRR=0;
     END;

***The following line corrects a problem in the NASS data set;
***Dry and irrigated acreage did not add up to total acreage;
IF CROP='WHE' AND STFIPS=40 THEN DO;
          NASIRR= NASACRE-NASDRY;
      END;

IF NASACRE='.' THEN DELETE;
IF NASDRY='.' THEN NASDRY=0;
IF NASIRR='.' THEN NASIRR=0;

***Acreage information is completed at this stage;
**############################################################;

***Begin generating yields;

***An analyis of the data shows that 100 percent dry (irrigated);
***land in 1987 corresponds to either 100 percent or 99 percent;
***dry (irrigated) land in 1990. To facilitate generating dry/irrigated;
***yields convert 99 percent dry(irrigated) acreage to;
***100 percent dry (irrigated) acreage;

   IF KPCTDRY=1 THEN DO;
          NASDRY=NASACRE;
          NASIRR= 0;
   END;

   IF KPCTIRR=1 THEN DO;
          NASIRR=NASACRE;
          NASDRY= 0;
   END;

***The new dry/irrigated ratios for 1990 are given by:;

NASACRE=NASDRY+NASIRR;
RPCTIRR= NASIRR/NASACRE;
RPCTDRY= NASDRY/NASACRE;

***For 100 percent dry/irrigated land yields are given by;

 IF RPCTDRY=1 THEN NASDYLD=NASYLD;
 IF RPCTIRR=1 THEN NASIYLD=NASYLD;
```

```
 IF NASIYLD='.' AND RPCTDRY=1 THEN NASIYLD=0;
 IF NASDYLD='.' AND RPCTIRR=1 THEN NASDYLD=0;

**##################################################;

**For crops that are both dry and irrigated in a given State;
**and for which there is no dry/irr. yield information in the NASS tape,;
**bring information from FRIS88 to generate these yields;
**Assume same dry/irr. ratios in 1988 as in 1990;

 NIACRE88= ACRE88*RPCTIRR;
 DACRE88= ACRE88*RPCTDRY;
 IF DACRE88='.' AND NIACRE88='.' THEN DELETE;
 IF DACRE88=0 THEN IYLD88=TYLD88;
 IF DACRE88=0 THEN DYLD88=0;
 IF NIACRE88=0 THEN DYLD88=TYLD88;
 IF NIACRE88=0 THEN IYLD88=0;

**Evaluating the data at this stage will show that;
**some irrigated (FRIS) yields are lower than NASS total yields;
**Make the following adjustment using the 1987 USARM data set;

 IF IYLD88 LT TYLD88 AND IYLD88 GT 0 THEN TYLD88= KAZYLD;
 IF IYLD88 LT TYLD88 AND IYLD88 GT 0 THEN IYLD88=KAZIYLD;

**Calculate dry and irrigated quantities for 1988 based;
**on NASS88 total yields and FRISS88 irrigated yields;

 NASQ88= ACRE88*TYLD88;
 NASIQ88= NIACRE88*IYLD88;
 NASDQ88= NASQ88-NASIQ88;
   IF NASIQ88 GT NASQ88 THEN DO;
      NASDQ88= NASQ88*DRYQPERC;
      NASIQ88= NASQ88 - NASDQ88;
      IYLD88= NASIQ88/NIACRE88;
   END;
 IF DYLD88 ='.' THEN DYLD88= NASDQ88/DACRE88;

**Apply 1988 quantity ratios to generate 1990 dry and;
**irrigated quantities;

 PCTIQ88= NASIQ88/NASQ88;
 NASQ= NASACRE*NASYLD;
 OURIQ= NASQ*PCTIQ88;
 OURDQ= NASQ-OURIQ;


**Calculate 1990 yields by dividing dry (irrigated) quantities;
**by dry (irrigated) acreage;

 IF NASIYLD='.' THEN DO;
     NASIYLD= OURIQ/NASIRR;
 END;
 IF NASDYLD='.' THEN DO;
     NASDYLD= OURDQ/NASDRY;
 END;
```

```
**#############################################################;

**Check if the new figures are reasonable;
**See the difference between the new yields and the 1987 yields;
**Some yield figures seem to be too high or too low relative;
**to 1987 levels.;

 DIF= NASIYLD-NASDYLD;
 DPCTCHG= ABS((NASDYLD-KAZDYLD)/KAZDYLD);
 IPCTCHG= ABS((NASIYLD-KAZIYLD)/KAZIYLD);
 PROPI= KAZIYLD/KAZYLD;
 PROPD= KAZDYLD/KAZYLD;

**Identify "outliers" or unreasonable high/low figures;
**make them missing observation;

IF CROP='BAR' AND (STFIPS=40 OR STFIPS=46) THEN DO;
    NASIYLD='.';
    NASDYLD='.';
END;

IF CROP='COR' AND (STFIPS=4 OR STFIPS=10 OR STFIPS=17 OR STFIPS=24
                   OR STFIPS=26 OR STFIPS=55) THEN DO;
    NASIYLD='.';
    NASDYLD='.';
END;

IF CROP='HAY' AND (STFIPS=6 OR STFIPS=32 OR STFIPS=35
              OR STFIPS=38) THEN DO;
    NASIYLD='.';
    NASDYLD='.';
END;

IF CROP='OAT' AND (STFIPS=38 OR STFIPS=46 OR STFIPS=56) THEN DO;
    NASIYLD='.';
    NASDYLD='.';
END;

**Make corrections applying the proportion of dry to irrigated;
**yields in 1987 to 1990;

IF NASDYLD='.' THEN DO;
   NASDYLD= PROPD*(NASYLD);
   NASDQ= NASDYLD*NASDRY;
   NASIQ=NASQ-NASDQ;
   NASIYLD= NASIQ/NASIRR;

END;

**Irrigated yield for corn in Delaware is above 200 bu/acre;
**Set this yield equal to that in Maryland and;
**calculate dry acreage residually;

   IF CROP='COR' AND STFIPS=10
         THEN DO;
   NASIYLD= 128.06;
```

```
   NASIQ= NASIYLD*NASIRR;
   NASDQ=NASQ-NASIQ;
  NASDYLD= NASDQ/NASDRY;
   END;

**Correct a problem with the original data;
**where dry and irrigated acreage did not add up to total acreage;
 IF STFIPS=40  AND CROP='WHE' THEN DO;
          NASIYLD= (NASACRE/NASIRR)*(NASYLD - (NASDRY/NASACRE)*NASDYLD);
          END;


**#########################################################;
**The following statements are used to check the consistency of the;
**data in terms total quantity produced;

TOTACRE=NASDRY+NASIRR;
NASDQ=NASDRY*NASDYLD;
NASIQ=NASIRR*NASIYLD;
TOTQ=NASDQ+NASIQ;


DATA G; SET MERGEB1;

IF NASDRY=0 THEN NASDRY='.';
IF NASIRR=0 THEN NASIRR='.';

IF NASQ NE TOTQ AND NASDRY<NASIRR THEN DO;
   NASIYLD=(NASQ-NASDQ)/NASIRR; END;
IF NASQ NE TOTQ AND NASDRY>NASIRR THEN DO;
   NASDYLD=(NASQ-NASIQ)/NASDRY; END;

IF NASDRY='.' THEN NASDRY=0;
IF NASIRR='.' THEN NASIRR=0;

NASDQ=NASDRY*NASDYLD;
NASIQ=NASIRR*NASIYLD;
TOTQ=NASDQ+NASIQ;

PROC SORT DATA=G; BY CROP STFIPS;

**#############################################################;
*Begin arranging data to create a dry/irrigated code;

DATA DRY; SET G;
 IF NASDRY>0;
ACRE=NASDRY;
YLD=NASDYLD;
YLD87=KAZDYLD;
CODE=0;
PROC SORT; BY CODE CROP STFIPS;

DATA IRR; SET G;
 IF NASIRR>0;
ACRE=NASIRR;
YLD=NASIYLD;
```

```
YLD87=KAZIYLD;
CODE=1;
PROC SORT; BY CODE CROP STFIPS;
**##########################################################;
**Put the final data set (NASSF.OUT) to be used with USARM;

DATA COMBINE; SET DRY IRR; PROC SORT; BY CODE CROP STFIPS;
DATA FINAL;
   SET COMBINE;
  FILE 'D:\RICARDO\NASS90\NASSF.OUT' LRECL=80;
  PUT STFIPS 1-2 CROP 4-6 CODE 8-9 @11 ACRE 10.3 @23 YLD 10.4;
RUN;
```

APPENDIX C: ASCSF.PRG

```
**********************ASCSF.PRG*********************************;
*************DATA ON GOVERNMENT PROGRAM PARTICIPATION************;

**This program organizes the ASCS 1990 data;
**The following data statement reads from a data set generated by;
**ASCS_A.PRG.

DATA ASCS90;
  INFILE 'D:\RICARDO\ASCS90\ASCS90.OUT' PAD LRECL=200;
  INPUT STFIPS CROP $ BASE1 ARP PLANTI CUPMT CU8PCT FIFTY92
        DEFACRE ESYLD PRGYLD PLANTED;
**total base acreage, effective ARP acres, 1990 intended planting;
**conserving use acreage for payment, 8% conserving use acreage;
**total 0-50/92 acres, deficiency payment acreage, established yields;
**program yields, planted acreage;
   DROP PLANTI ESYLD;
   PROC SORT DATA=ASCS90; BY CROP STFIPS;

**The data set above is for complying farms only.  In order to obtain;
**total base, a percent compliance figure is used from NEWS (USDA;
**publication;
DATA PERCENT;
 INFILE 'D:\RICARDO\ASCS90\PCTBASE.DAT' PAD LRECL=200;
  INPUT STFIPS STNAME $ CROP $ PCT TBASE1;

**TBASE1 is total base acreage when percent compliance is 0;
**This figure was not available in the previous data set;

  PROC SORT DATA=PERCENT; BY CROP STFIPS;

DATA TOTBASE;
  MERGE ASCS90 PERCENT; BY CROP STFIPS;
  IF BASE1=0 AND PCT='.' THEN DELETE;
  IF BASE1=0 AND TBASE1=0 THEN DELETE;
  IF PCT NE 0 THEN TBASE90= (BASE1/(PCT/100));
  IF PCT =0 THEN TBASE90= BASE1;
  IF BASE1=0 THEN TBASE90=TBASE1;


**Published information obtained from ASCS does not break down between;
**irrigated and non-irrigated farms. 1989 dry/irrigated acreage figures;
**provided by Alex Barbarika were used to complete the data set;
**Cotton is not included in Barbaika's data;

DATA DRYIRR;
 INFILE 'D:\RICARDO\ASCS90\DRYIRR90.DAT' PAD LRECL=200;
  INPUT CROP $ STFIPS BASED89 BASEI89 YDRY89 YIRR89;
  PROC SORT DATA=DRYIRR; BY CROP STFIPS;


** Use USARM87 figures for comparison;

DATA DRYIRR87;
 INFILE 'D:\RICARDO\ASCS90\DRYIRR87.OUT' PAD LRECL=80;
```

```
  INPUT STFIPS CROP $ IRAT87 DRAT87;
  PROC SORT DATA=DRYIRR87; BY CROP STFIPS;


**#########################################################################;
**Begin merging all data sets and create variables;
**TBASE90 (total base), BASED90 and PLANTD90 (dry base);
** and BASEI90 (irrigated base). Do the same for planted acres;

DATA NEW;
  MERGE TOTBASE DRYIRR DRYIRR87; BY CROP STFIPS;
  IF BASED89='.' THEN BASED89=0;
  IF BASEI89='.' THEN BASEI89=0;
  TBASE89= BASED89 + BASEI89;
     DRATIO= BASED89/TBASE89;
     IRATIO= BASEI89/TBASE89;
     BASED90= TBASE90*DRATIO;
     BASEI90= TBASE90 - BASED90;
     PLANTD90=  PLANTED*DRATIO;
     PLANTI90=  PLANTED - PLANTD90;

** For cotton use 1987 (dry/irrigated) ratios;
    IF CROP='COT' THEN DO;
        PLANTI90=PLANTED*IRAT87;
        PLANTD90=PLANTED*DRAT87;
    END;

**Cotton in Kansas is all dry;
    IF CROP='COT' AND STFIPS=20 THEN DO;
         PLANTD90=PLANTED;
         PLANTI90=0;
    END;

**Rice is all irrigated;
    IF CROP='RIC' THEN DO;
         PLANTI90=PLANTED;
         PLANTD90=0;
    END;

  IF TBASE90='.' THEN DELETE;
  IF PLANTED=0 THEN PLANTD90=0;
  IF PLANTED=0 THEN PLANTI90=0;

**This completes the information needed for program participation data;
**#########################################################################;

**The section that follows sets the data in a similar form as in;
**USARM87 (ASCS87.DAT). First, a code is created for;
**dry and irrigated base and planted acreage;
DATA ASCSDRY;
  SET NEW;
  PASCS90= PLANTD90;
  PYLD90= YDRY89;
  IF CROP='COT' THEN PYLD90=PRGYLD;
  ARP90= ARP;
  CU8PCT90= CU8PCT;
```

```
  CUPMT90= CUPMT;
  FIF9290= FIFTY92;
  DEFAC90= DEFACRE;
  BASE90=TBASE90;
  CODE=0;


DATA ASCSIRR;
  SET NEW;
  IF CROP NE 'RIC' THEN DO;
    PASCS90= PLANTI90;
    PYLD90= YIRR89;
    ARP90=0;
    CU8PCT90= 0;
    CUPMT90=0;
    FIF9290=0;
    DEFAC90=0;
    BASE90= TBASE90;
    CODE=1;
  END;

  IF CROP = 'RIC' THEN DO;
    PASCS90= PLANTI90;
    PYLD90= PRGYLD;
    ARP90= ARP;
    CU8PCT90= CU8PCT;
    CUPMT90= CUPMT;
    FIF9290= FIFTY92;
    DEFAC90=DEFACRE;
    BASE90= TBASE90;
    CODE=1;
  END;

   IF CROP='COT' AND STFIPS=4 THEN DO;
**Arizona;
    PYLD90= PRGYLD;
    ARP90= ARP;
    CU8PCT90= CU8PCT;
    CUPMT90= CUPMT;
    FIF9290= FIFTY92;
    DEFAC90=DEFACRE;
    CODE=1;
  END;

   IF CROP='COT' AND STFIPS=6 THEN DO;
**  California;
    PYLD90= PRGYLD;
    ARP90= ARP;
    CU8PCT90= CU8PCT;
    CUPMT90= CUPMT;
    FIF9290= FIFTY92;
    DEFAC90=DEFACRE;
    CODE=1;
    END;

DATA ASCSTOT;
```

```
  SET ASCSDRY ASCSIRR;
  PROC SORT DATA=ASCSTOT; BY CODE CROP STFIPS;
**##########################################################;

**##########################################################;
**This section reads from the 1987 data set for comparison;
**purposes;
DATA KAZIM87;
  INFILE 'D:\RICARDO\ASCS90\ASCS87.DAT' PAD LRECL=200;
  INPUT STFIPS CROP $ CODE BASE87 PLAN87 HARV87 PLD87
        ARP87 F5092 PYLD87;
  PROC SORT DATA=KAZIM87; BY CODE CROP STFIPS;


** Merge data set to make the 1987 data and the 1990 data comparable;
** The USARM 87 data have either dry or irrigated base acreage;
** Conserving use acreage is assumed to be dry. Planted acreage;
** is stratified by dry/irrigated practices;

DATA MER8790;
   MERGE ASCSTOT KAZIM87; BY CODE CROP STFIPS;

**Set the data in the same format as in USARM87;
**Total base acreage is allocated as either dry or irrigated;

   IF CODE=0 AND BASE87 GT 0 AND BASE90 GT 0 THEN NBASE=BASE90;
   IF CODE=1 AND BASE87 GT 0 AND BASE90 GT 0 THEN NBASE=BASE90;

   IF CODE=0 AND BASE87='.' AND CROP NE 'RIC' THEN NBASE=BASE90;
**this allocates all base acreage to crops other than rice;
**i.e., crops that have a base in 1990 and not in 1987;

   IF CROP='COT' AND CODE=0 AND STFIPS=4 THEN DELETE;
   IF CROP='COT' AND CODE=0 AND STFIPS=6 THEN DELETE;

**There are States that have only irrigated cotton;
   IF CROP='RIC' AND CODE=0 THEN DELETE;
   IF CROP='WHE' AND CODE=0 AND STFIPS=4 THEN PYLD90=PRGYLD;


   IF PASCS90=0 AND PRGYLD=0 THEN PYLD90=0;
   IF NBASE='.' THEN NBASE=0;
   IF PASCS90 GT 0 AND PYLD90 ='.' THEN PYLD90=PRGYLD;
   IF CROP='BAR' AND CODE=0 AND STFIPS=4 THEN PYLD90=PRGYLD;
   IF CODE=1 AND PASCS90=0 THEN PYLD90=0;
   IF NBASE=0 AND PASCS90=0 THEN DELETE;

PROC SORT DATA=MER8790; BY STFIPS CROP CODE;

**Put the final data set for USARM90;
*DATA Z;
*   SET MER8790;
*   FILE 'D:\ASCS90\ASCSF.OUT' LRECL=120;
*   PUT STFIPS 1-2 CROP 4-6 CODE 8-9 @12 NBASE 10.3 @25 PASCS90 10.3
*       @37 PYLD90 10.3 @50 ARP90 10.3 @62 FIF9290 10.3
*       @75 CU8PCT90 10.3 @87 CUPMT90 10.3 @100 DEFAC90 10.3;
```

```
*RUN;
**#################################################################;
**ASCS data reports planted acreage, but not harvested acreage;
**In order to obtain harvested acreage use failure rates (the;
**ratio of harvested to planted acreage) from NASS;
**First read the NASS data set;

DATA FAIL90;
 INFILE 'D:\RICARDO\ASCS90\NASS90B.OUT' PAD;
  INPUT STFIPS CROP $ TPACRE THACRE DPACRE DHACRE IPACRE IHACRE
        TYLD DYLD IYLD;
**total planted acres, total harvested acres, dry planted acres;
**dry harvested acres, irrigated planted acres, irrigated harvested acres;
**total yields, dry yields, irrigated yields;
**Adjust units and redefine variable names;

  NASACRE=THACRE/1000;
  NASDRY=DHACRE/1000;
  NASIRR=IHACRE/1000;
  NASYLD= TYLD;
  NASDYLD= DYLD;
  NASIYLD= IYLD;
  IF DPACRE=0 THEN DPACRE='.';
  IF IPACRE=0 THEN IPACRE='.';
  IF STFIPS=18 AND CROP='OAT' THEN TPACRE=THACRE;

 **create ratios;
  TNASRATI= TPACRE/THACRE;
  DNASRATI= DPACRE/DHACRE;
  INASRATI= IPACRE/IHACRE;
  IF DNASRATI='.' THEN DNASRATI=TNASRATI;
  IF INASRATI= '.' THEN INASRATI=TNASRATI;

  IF CROP='HAY' OR CROP='SOY' THEN DELETE;
 **these crops are not included for government payments;
  PROC SORT DATA=FAIL90; BY STFIPS CROP;

 **organize data for dry crops;
 DATA FAILDRY; SET FAIL90;
  KEEP STFIPS CROP FAILRATE CODE;
  FAILRATE=DNASRATI;
  CODE=0;

 **organize data for irrigated crops;
 DATA FAILIRR; SET FAIL90;
  KEEP STFIPS CROP FAILRATE CODE;
  FAILRATE=INASRATI;
  CODE=1;

 **set dry and irrigated data;
 DATA FAIL; SET FAILDRY FAILIRR;
  PROC SORT; BY STFIPS CROP CODE;

 **Merge orginal ASCS data with data containing new ratios;
 DATA ASCSFAIL; MERGE MER8790 FAIL; BY STFIPS CROP CODE;
```

```
**correct for units of measurenment;
NBASE= NBASE/1000;
ARP90=ARP90/1000;
FIF9290= FIF9290/1000;
CU8PCT90=CU8PCT90/1000;
CUPMT90=CUPMT90/1000;
DEFAC90=DEFAC90/1000;

**calculate ASCS harvested acreage;

ASCSHARV= PASCS90/FAILRATE;
PASCS90= PASCS90/1000;
ASCSHARV= ASCSHARV/1000;
 IF ASCSHARV='.' THEN DELETE;

 PROC SORT; BY CROP CODE STFIPS;

**put the final ASCS data to be used in USARM;
 DATA ASCS90X;
    SET ASCSFAIL;
    FILE 'D:\RICARDO\ASCS90\ASCSFX.OUT' LRECL=140;
    PUT STFIPS 1-2 CROP $ 4-6 CODE 8-9 @12 NBASE 10.3 @25 PASCS90 10.3
        @37 PYLD90 10.3 @50 ARP90 10.3 @62 FIF9290 10.3
        @75 CU8PCT90 10.3 @87 CUPMT90 10.3 @100 DEFAC90 10.3
        @112 ASCSHARV 10.3 @124 FAILRATE 10.3;

ENDSAS;
```

APPENDIX D: PRICE90.PRG

```
**********************PRICE90.PRG*************************;
***********CROP PRICES AND DEFICIENCY PAYMENT DATA**********;


**This program organizes the data for State-level crop prices;
**loan rates, pasture rents, national-level crop prices;
**target prices, ARP rates, loan rates, and crop demand elasticities;

OPTIONS LINESIZE=132;
** Read regional price data;

DATA PRICE90;
 INFILE 'D:\RICARDO\PRICE90\PRICE90.DAT' PAD;
  INPUT STFIPS STNAME $ CROP $ PRICE90;

**Variable definition;
**   STFIPS: State code;
**   STNAME:  State name;
**   CROP:    crop code;
**   PRICE90 regional crop prices;
*These data were obtained from NASS AGRIC. PRICES 1990 SUMMARY;
*These prices do not include government payments;

*IF CROP='RIC' THEN PRICE90=PRICE90 - 1.56;
*This step reduces rice prices by the amount of government payments;

IF CROP='SOR' THEN PRICE90=PRICE90*.56;
*This step converts sorghum price from cwt. price to bushel price;

IF STFIPS=0 OR STFIPS=2 OR STFIPS=15 THEN DELETE;

PROC SORT DATA=PRICE90; BY STFIPS;
**#############################################################;
** Read loan rate data;

DATA LOAN90A;
 INFILE 'D:\RICARDO\PRICE90\LRATE90.OUT' PAD;
  INPUT STFIPS CROP $ LOAN90;

**Variable definition:;
** LOAN90: regional loan rates;
**County-level data are agregated to the State level;

  PROC SORT DATA=LOAN90A; BY CROP STFIPS;
**#############################################################;
** Read loan rates for cottn and rice;

DATA LOAN90B;
 INFILE 'D:\RICARDO\PRICE90\COTLOAN.DAT' PAD;
  INPUT STFIPS CROP $ LOAN90;
 PROC SORT DATA=LOAN90B; BY CROP STFIPS;

**These data supplement the above data set, which does not include;
**loan rates for cotton and rice;
```

```
* merge both loan rate data stes;
DATA LOAN90;
  MERGE LOAN90A LOAN90B; BY CROP STFIPS;
IF STFIPS=0 OR STFIPS=2 OR STFIPS=15 THEN DELETE;
IF CROP='COT' THEN LOAN90=LOAN90/100;
IF CROP='SOR' THEN LOAN90=LOAN90*.56;
*Adjust units of measure;

PROC SORT DATA=LOAN90; BY CROP STFIPS;

** Read pasture rent data;
DATA PASRENT;
 INFILE 'D:\RICARDO\PRICE90\PASTURE9.DAT' PAD;
  INPUT STFIPS YEAR STNAME $ PRENT90;
**Variable definition;
**PRENT90: pasture rent in 1990;

IF STFIPS=0 OR STFIPS=2 OR STFIPS=15 THEN DELETE;
PROC SORT DATA=PASRENT; BY STFIPS;

**Read the national-level price data;
DATA NATPRICE;
 INFILE 'D:\RICARDO\PRICE90\NATPRICE.DAT' PAD;
  INPUT CROP $ NMP90 DEFPAY90 ARP90 ELAS90 TPRICE NLOAN;

**Variable definition;
**NMP90: national crop market price;
**DEFPAY90: deficiency payment rate;
**ARP90: ARP rates;
**ELAS90: crop demand elasticities;
**TPRICE: target price;
**NLOAN: national-level loan rates;

PROC SORT DATA=DEFICPAY; BY CROP;

**Merge data that are common to both participating and nonpart. farms;
DATA PRICE1; MERGE PRICE90 PASRENT; BY STFIPS;
PROC SORT DATA=PRICE1; BY CROP STFIPS;

**Merge data that apply to participating farmers;
DATA PRICE2; MERGE PRICE1 LOAN90; BY CROP STFIPS;
*IF LOAN90='.' THEN LOAN90=0;
*IF PRICE90='.' THEN DELETE;

**Merge participating farm data with national price data;
**Assign code PRG=1 to participating farmers;
DATA PRG; MERGE PRICE2 NATPRICE; BY CROP;
 IF DEFPAY90='.' THEN DEFPAY90=0;

*IF PRICE90<=LOAN90 THEN PP90=LOAN90;
*ELSE PP90=PRICE90;
 PRG=1;

**Merge nonparticipating farm data with national price data;
**Assign code PRG=0 to non-participating farmers;
DATA NPRG;  MERGE PRICE1 NATPRICE; BY CROP;
```

```
 DEFPAY90=0;
*ARP90=0;
 LOAN90=0.00;
 PRG=0;

**Set program and nonprogram participation data;
DATA ALLBUDG1; SET PRG NPRG;
 PROC SORT; BY PRG CROP STFIPS;

**Compare with USARM 87 data (read price87.out);
DATA PRICE87;
  INFILE 'D:\RICARDO\PRICE90\PRICE87.OUT' LRECL=120;
  INPUT STFIPS CROP $ PRG PRICE LOAN OLDRENT PASRENT NMPRICE
        DEFPAY ARP ELAS PPRICE;
  PROC SORT DATA=PRICE87;BY PRG CROP STFIPS;

**For States that do not have pasture rent information;
**assume the same rates as those of neighboring States;
DATA A8790;
  MERGE PRICE87 ALLBUDG1; BY PRG CROP STFIPS;
  IF STFIPS=4 THEN PRENT90= 8.20;
  IF STFIPS=35 THEN PRENT90= 8.20;
  IF STFIPS=32 THEN PRENT90= 20.20;
  IF STFIPS=41 THEN PRENT90= 16.40;
  IF STFIPS=34 THEN PRENT90= 21.60;
  IF STFIPS=9 OR STFIPS=25 OR STFIPS=33 OR STFIPS=44 THEN
     PRENT90=16.00;

  IF PRICE90='.' THEN PRICE90= NMP90;
  IF LOAN90='.' THEN LOAN90= NLOAN;
  IF PRICE='.' THEN DELETE;

**Put final data (PRICE90F.OUT);
DATA Z;
  SET A8790;
  FILE 'D:\RICARDO\PRICE90\PRICE90F.OUT' LRECL=120;
  PUT STFIPS 1-2 CROP 4-6 PRG 8-9 @11 PRICE90 6.3 @19 LOAN90 6.3
      @26 NMP90 6.3 @33 DEFPAY90 6.3 @40 ARP90 6.3 @47 ELAS90 6.3
      @54 TPRICE 6.3 @61 NLOAN 6.3 @68 PRENT90 6.3;

RUN;
```

APPENDIX E: CRP90.PRG

```
**********CRP90.PRG**********;
***********DATA ON THE CONSERVATION RESERVE PROGRAM********;
**This program organizes CRP data for USARM;

DATA CRP90A;
 INFILE 'D:\RICARDO\CRP90\USARM.CRP' PAD LRECL=200;
 INPUT PRG STFIPS STATE $ CRPBASE CRPACRE CRPBAR CRPCOR CRPCOT
       CRPRIC CRPWHE CRPSOR CRPOAT COSTSHR PRICE ;
**Variable definition;
**CRPBASE= total acres of retired base;
**CRPACRE= total acres enrolled in CRP as of 1990;
**CRPBAR, CRPCOR, etc= acres of retired base by crops;
**COSTSHR= lump sum cost share for maintenance;
**PRICE= annual rent in dollars per acre;
**define "CRP" as another crop;
**Assume CRP land is only dry;
 CROP= 'CRP';
 CODE= 0;
 KEEP STFIPS CROP PRG CODE CRPACRE PRICE COSTSHR;
 PROC SORT DATA=CRP90A; BY STFIPS PRG;

**Read data on CRP acres planted to trees;

DATA CRPTREE;
 INFILE 'D:\RICARDO\CRP90\TREECRP.DAT' PAD LRECL=200;
 INPUT STFIPS STNAME $ PRG CRPTREE;
 PROC SORT DATA=CRPTREE; BY STFIPS PRG;

**Merge the above data sets;
DATA CRPMERG;
  MERGE CRP90A CRPTREE; BY STFIPS PRG;
  IF STFIPS=2 OR STFIPS=15 OR STFIPS=43 THEN DELETE;
  IF CRPTREE='.' THEN CRPTREE=0;
  PROC SORT DATA=CRPMERG; BY PRG STFIPS;

**Set the final data set to be merged with other USARM data(e.g NASS);
 DATA CRP; SET CRPMERG;
   FILE 'D:\RICARDO\CRP90\CRPACRE.DAT' LINESIZE=200;
   PUT @1 STFIPS 4. @6 CROP 4. @11 PRG 2. @15 CODE 2. @19 CRPACRE 10.2
       @30 PRICE 10.2 @41 COSTSHR 10.2 @52 CRPTREE 10.2;
 ENDSAS;
**##########################################################################;
```

APPENDIX F: FCRS90.PRG

```
**********FCRS90.PRG**********;
** This program updates the FCRS data used in the 1987 USARM;
** Input prices are adjusted using cost-of-production indices;
** Input quantities are assumed to have remained the same;
DATA FCRS90;
 INFILE 'D:\RICARDO\FCRS90\FCRS87.OUT' LRECL=340;
 INPUT STFIPS 1-2 CROP $ 4-6  CODE 7-8
     @10 SEEDP     6.3        @18 SEEDQ     6.3
     @26 NITP      6.3        @34 NITQ      6.3
     @42 PHOSP     6.3        @50 PHOSQ     6.3
     @58 POTP      6.3        @66 POTQ      6.3
     @74 LIMEP     6.3        @82 LIMEQ     6.3
     @90 MANUREP   6.3        @98 MANUREQ   6.3
     @106 SULFP    6.3        @114 SULFQ    6.3
     @122 HERB     6.3        @130 INSECT   6.3
     @138 TRACEP   6.3        @146 TRACEQ   6.3
     @154 FUNGDEF  6.3        @162 CUSTOM   6.3
     @170 FUEL     6.3        @178 REPAIR   6.3
     @186 LABP     6.3        @194 LABEX    6.3
     @202 MISC     6.3        @210 DRYGIN   6.3
     @218 TCHSER   6.3        @226 OVERH    6.3
     @234 TAXINS   6.3        @242 INTOLD   6.3
     @250 KREPL    6.3        @256 INT      6.3
     @264 DFUEL    6.3        @272 IFUEL    6.3
     @280 TOTFUEL  6.3        @288 DRYFUEL  6.3
     @296 IRRFUEL  6.3        @304 WATP     6.3
     @312 WATQ     6.3 ;

 **PROC SORT DATA=FCRS90; *BY CODE CROP STFIPS;

 ** Define price/cost adjustment factors to update data;
 ** Growth rates are obtained from Indices of Prices Paid, Ag Statistics;

 DATA FCRS2;
      SET FCRS90;

      ISEED= (165 -148)/148;
      IFERT= (131-118)/118;
      IAGCHEM= (139-124)/124;
      IFSERV= (166-149)/149;
      IWAGE= (191-166)/166;
      IPITW= (172-151)/151;
      ITAX= (157-144)/144;
      IINT= (174-189)/189;
      IENER= (204-164)/164;
      SEEDP   = SEEDP*(1+ISEED);
      NITP    = NITP*(1+IFERT);
      PHOSP   = PHOSP*(1+IFERT);
      POTP    = POTP*(1+IFERT);
      LIMEP   = LIMEP*(1+IFERT);
      MANUREP = MANUREP*(1+IFERT);
      SULFP   = SULFP*(1+IFERT);
      INSECT  = INSECT*(1+IAGCHEM);
      HERB    = HERB*(1+IAGCHEM);
```

```
      TRACEP  = TRACEP*(1+IFERT);
      CUSTOM  = CUSTOM*(1+IFSERV);
      REPAIR  = REPAIR*(1+IFSERV);
      LABEX   = LABEX*(1+IWAGE);
      DRYGIN  = DRYGIN*(1+IENER);
      FUNGDEF = FUNGDEF*(1+IAGCHEM);
      FUEL    = FUEL*(1+IENER);
      LABP    = LABP*(1+IWAGE);
      MISC    = MISC*(1+IPITW);
      OVERH   = OVERH*(1+IPITW);
      INTOLD  = INTOLD*(1+IINT);
      INT     = INT*(1+IINT);
      IFUEL   = IFUEL*(1+IENER);
      DRYFUEL = DRYFUEL*(1+IENER);
      WATP    = WATP*(1+IENER);
      TCHSER  = TCHSER*(1+IFSERV);
      TAXINS  = TAXINS*(1+ITAX);
      KREPL   = KREPL*(1+IPITW);
      DFUEL   = DFUEL*(1+IENER);
      TOTFUEL = TOTFUEL*(1+IENER);
      IRRFUEL =  IRRFUEL*(1+IENER);

 PROC SORT DATA=FCRS2; BY CODE CROP STFIPS;

DATA FCRSF;
  SET FCRS2;
 FILE 'D:\RICARDO\FCRS90\FCRS90.OUT' LRECL=340;
 PUT STFIPS 1-2 CROP $ 4-6  CODE 7-8
      @10 SEEDP     6.3        @18 SEEDQ     6.3
      @26 NITP      6.3        @34 NITQ      6.3
      @42 PHOSP     6.3        @50 PHOSQ     6.3
      @58 POTP      6.3        @66 POTQ      6.3
      @74 LIMEP     6.3        @82 LIMEQ     6.3
      @90 MANUREP   6.3        @98 MANUREQ   6.3
      @106 SULFP    6.3        @114 SULFQ    6.3
      @122 HERB     6.3        @130 INSECT   6.3
      @138 TRACEP   6.3        @146 TRACEQ   6.3
      @154 FUNGDEF  6.3        @162 CUSTOM   6.3
      @170 FUEL     6.3        @178 REPAIR   6.3
      @186 LABP     6.3        @194 LABEX    6.3
      @202 MISC     6.3        @210 DRYGIN   6.3
      @218 TCHSER   6.3        @226 OVERH    6.3
      @234 TAXINS   6.3        @242 INTOLD   6.3
      @250 KREPL    6.3        @256 INT      6.3
      @264 DFUEL    6.3        @272 IFUEL    6.3
      @280 TOTFUEL  6.3        @288 DRYFUEL  6.3
      @296 IRRFUEL  6.3        @304 WATP     6.3
      @312 WATQ     6.3 ;

ENDSAS;
```

APPENDIX G: FINAL90.PRG

```
**********FINAL90.PRG**********;
** This program merges the different blocks of the data in order to;
** generate the basic USARM data set;

** Read the NASS data set;

DATA NASS;
  INFILE 'A:\NASS90\NASSF.OUT' LRECL=80;
  INPUT STFIPS CROP $ CODE  ACRE YLD;
  PROC SORT DATA=NASS; BY CODE CROP STFIPS;

** Read the FCRS data set;
DATA FCRS1;
 INFILE 'A:\FCRS90\FCRS90.OUT' LRECL=340;
 INPUT STFIPS 1-2 CROP $ 4-6  CODE 7-8
     @10 SEEDP     6.3        @18 SEEDQ     6.3
     @26 NITP      6.3        @34 NITQ      6.3
     @42 PHOSP     6.3        @50 PHOSQ     6.3
     @58 POTP      6.3        @66 POTQ      6.3
     @74 LIMEP     6.3        @82 LIMEQ     6.3
     @90 MANUREP   6.3        @98 MANUREQ   6.3
     @106 SULFP    6.3        @114 SULFQ    6.3
     @122 HERB     6.3        @130 INSECT   6.3
     @138 TRACEP   6.3        @146 TRACEQ   6.3
     @154 FUNGDEF  6.3        @162 CUSTOM   6.3
     @170 FUEL     6.3        @178 REPAIR   6.3
     @186 LABP     6.3        @194 LABEX    6.3
     @202 MISC     6.3        @210 DRYGIN   6.3
     @218 TCHSER   6.3        @226 OVERH    6.3
     @234 TAXINS   6.3        @242 INTOLD   6.3
     @250 KREPL    6.3        @256 INT      6.3
     @264 DFUEL    6.3        @272 IFUEL    6.3
     @280 TOTFUEL  6.3        @288 DRYFUEL  6.3
     @296 IRRFUEL  6.3        @304 WATP     6.3
     @312 WATQ     6.3 ;

  PROC SORT DATA=FCRS1; BY CODE CROP STFIPS;

 ** Merge NASS and FCRS data;

  DATA A;
    MERGE NASS FCRS1; BY CODE CROP STFIPS;

 ** Define labor quantities (expenditure/wage rate);
  LABQ=LABEX/LABP;

 ** Define cost variables;
  OTHERFER = (POTP*POTQ)+(LIMEP*LIMEQ)+(MANUREP*MANUREQ)+(SULFP*SULFQ)
             +(TRACEP*TRACEQ);

  OTHERVC = OTHERFER+(SEEDP*SEEDQ+CUSTOM+REPAIR+MISC+DRYGIN+TCHSER
           +OVERH+TAXINS+INT);

  TOTCOST = SUM ((NITP*NITQ),(PHOSP*PHOSQ),(WATP*WATQ),(LABP*LABQ),
```

```
                HERB,INSECT,FUNGDEF,DRYFUEL,IRRFUEL,KREPL,OTHERVC, 0);

   PROC SORT DATA=A; BY CROP STFIPS;

**Read crop prices and deficiency payment data;
DATA PRICE90;
  INFILE 'A:\PRICE90\PRICE90F.OUT' LRECL=120;
  INPUT STFIPS 1-2 CROP $ 4-6 PRG 8-9 @11 PRICE90 6.3 @19 LOAN90 6.3
      @26 NMP90 6.3 @33 DEFPAY90 6.3 @40 NARP90 6.3 @47 ELAS90 6.3
      @54 TPRICE 6.3 @61 NLOAN 6.3 @68 PRENT90 6.3;

** Set data for participating farms only;
DATA PRICE1;
  SET PRICE90;
  IF PRG=0 THEN DELETE;
  IF PRICE90<=LOAN90 THEN PPRICE=LOAN90;
  ELSE PPRICE=PRICE90;
  PROC SORT DATA=PRICE1; BY CROP STFIPS;

** Merge program participation data with NASS/FCRS data;
DATA PRGBUDG;
  MERGE A PRICE1; BY CROP STFIPS;

** Set data for nonparticipation farms;
DATA PRICE2;
  SET PRICE90;
  IF PRG=1 THEN DELETE;
  PROC SORT DATA=PRICE2; BY CROP STFIPS;

** Merge nonprogram participation data with NASS/FCRS data;
DATA NPRGBUDG;
  MERGE A PRICE2; BY CROP STFIPS;

** Set participation and nonparticipation data together;
DATA AB;
   SET PRGBUDG NPRGBUDG;

** Read CRP data and define CRP variables;
 DATA CRP1;
  INFILE 'A:\CRP90\CRPACRE.DAT' LINESIZE=200;
  INPUT @1 STFIPS 4. @6 CROP $ 4. @11 PRG 2. @15 CODE 2. @19 CRPACRE 10.2
       @30 PRICE 10.2 @41 COSTSHR 10.2 @52 CRPTREE 10.2;

ACRE= CRPACRE;
CRPTREE= CRPTREE/1000;
OTHERVC=(COSTSHR/10)+7;
PRICE90=PRICE;
NARP90=0.00;
YLD=1.00;
NMP90=0.00;
LOAN90=0.00;

PROC SORT DATA=CRP1; BY CROP STFIPS;

** Merge CRP data with the NASS/FCRS/PRICE data set;
DATA ABC; SET AB CRP1;
```

```
    PROC SORT DATA=ABC; BY CROP CODE STFIPS;

*##################################################################;

**Read ASCS data. Define variables associated with program participation;
DATA ASCS90;
   INFILE 'A:\ASCS90\ASCSFX.OUT' LRECL=140;
   INPUT STFIPS 1-2 CROP $ 4-6 CODE 8-9 @12 NBASE 10.3 @25 PASCS90 10.3
       @37 PYLD90 10.3 @50 ARP90 10.3 @62 FIF9290 10.3
       @75 CU8PCT90 10.3 @87 CUPMT90 10.3 @100 DEFAC90 10.3
       @112 ASCSHARV 10.3 @124 FAILRATE 10.3;

IF CROP='RIC' THEN PYLD90=PYLD90/100;
NBASE=(NBASE-FIF9290);
PRG=1;
IF ASCSHARV='.' THEN DELETE;
PROC SORT; BY STFIPS CROP CODE;

PROC SORT DATA=ASCS90; BY CROP CODE STFIPS;

*##################################################################;


** Merge ASCS data with the rest. Define the correct acreage for;
** participating and nonparticipating farms;

DATA ABCD; MERGE ABC ASCS90; BY CROP CODE STFIPS;
 IF ASCSHARV='.' THEN ASCSHARV=0;
 IF ACRE='.' THEN DELETE;
 IF CROP='CRP' THEN ACRE=ACRE/1000;
 IF ((CROP='HAY') OR (CROP='SOY')) AND PRG=1 THEN DELETE;
 IF PRG=1 AND ((CROP NE 'CRP') OR (CROP NE 'SOY')) THEN NEWACRE=ASCSHARV;
 IF PRG=1 AND ((CROP='CRP') OR (CROP='SOY')) THEN NEWACRE=ACRE;
 IF PRG=0 THEN NEWACRE=ACRE-ASCSHARV;
 IF PYLD90='.' THEN DO;
 PYLD90=YLD;
 FAILRATE=1;
 NBASE=0;
END;
 IF PRG=0 THEN DO;
 PYLD90=0;
 NBASE=0;
 FAILRATE=0;
END;
 IF CROP='COT' AND PRG=1 AND CODE=1 THEN PYLD90=YLD;
*****************************************************************;

** These conditions temprorarily fix an ASCS data problem;
** ASCS at times reports more harvested acreage than NASS;
** Allow at least 1,000 acres of nonparticipation acrage;

 IF PRG=0 AND NEWACRE<0 THEN NEWACRE=1;
 IF PRG=1 AND ASCSHARV>ACRE THEN NEWACRE=ACRE-1;
 IF NEWACRE LT 0 THEN NEWACRE=0;
*****************************************************************;
 IF NEWACRE=0 THEN DELETE;
```

```
 NEWACRE=NEWACRE*1000;

** Define peracre profits;
 PROFIT=(YLD*PRICE90)-TOTCOST;

** Make sure profits are non-negative and at least equal to;
** pasture rents;
 IF PROFIT<0 OR PROFIT<PRENT90 THEN NEWOVC=OTHERVC-PRENT90+PROFIT;
 ELSE NEWOVC=OTHERVC;

NEWTC=(NITP*NITQ)+(PHOSP*PHOSQ)+(WATP*WATQ)+(LABP*LABQ)
         +HERB+INSECT+FUNGDEF+DRYFUEL+IRRFUEL+KREPL+NEWOVC;

*IF PRG=1 THEN NEWPROF=(YLD*PPRICE)+(PRGYLD*DEFPAY*FAILRATE)-NEWTC;
*IF CROP='RIC' AND PRG=1 THEN
*  NEWPROF=(YLD*PPRICE)+(YLD*1.13)+(PRGYLD*DEFPAY*FAILRATE)-NEWTC;
*IF PRG=0 THEN NEWPROF=(YLD*PRICE)-NEWTC;

** Recalculate new profit figures;
 NEWPROF=(YLD*PRICE90)-NEWTC;
 IF CROP='CRP' THEN NEWOVC=OTHERVC;

** Read codes for geographical regions;
DATA GAMSREG;
  INFILE 'A:\GAMSREG.DAT' PAD;
  INPUT FEDREG $ GAMSREG $ STFIPS STNAME $ FEDNUM GAMSST $;
    IF FEDNUM=1 THEN FEDREG= 'R-PS';
    IF FEDNUM=2 THEN FEDREG= 'R-MT';
    IF FEDNUM=3 THEN FEDREG= 'R-NP';
    IF FEDNUM=4 THEN FEDREG= 'R-SP';
    IF FEDNUM=5 THEN FEDREG= 'R-LS';
    IF FEDNUM=6 THEN FEDREG= 'R-CB';
    IF FEDNUM=7 THEN FEDREG= 'R-DS';
    IF FEDNUM=8 THEN FEDREG= 'R-NE';
    IF FEDNUM=9 THEN FEDREG= 'R-AP';
    IF FEDNUM=10 THEN FEDREG='R-SE';
  PROC SORT DATA=GAMSREG; BY STFIPS;

DATA ARMDAT1;
   SET ABCD;
   PROC SORT DATA=ARMDAT1; BY STFIPS;

** Merge the "region-code" data with the rest;
DATA ARMDAT2;
    MERGE ARMDAT1 GAMSREG; BY STFIPS;
    IF STFIPS=2 OR STFIPS=15 OR STFIPS=43 THEN DELETE;
    IF PRG=1 THEN EXT='P';
    ELSE EXT='N';
    IF CODE=1 THEN IRRCODE='I';
    ELSE IRRCODE='D';
    NEWACRE=NEWACRE/1000;
    PROC SORT DATA=ARMDAT2; BY EXT CROP IRRCODE GAMSST;

** Read the data for maximum acreage (historical maximum);
DATA MAXACRE;
 INFILE 'A:\MAXACRE.OUT' PAD;
```

```
  INPUT EXT $ IRRCODE $ CROP $ GAMSST $ MAXACRE;

  PROC SORT DATA=MAXACRE; BY EXT CROP IRRCODE GAMSST;

**Merge maximun acreage with the rest of the data;
DATA COMBINE1;
 MERGE ARMDAT2 MAXACRE; BY EXT CROP IRRCODE GAMSST;
 PROC SORT DATA=COMBINE; BY PRG CROP CODE GAMSREG;

** Set the final data set;
DATA X; SET COMBINE1;
 FILE 'A:\ARM90B.OUT'  LRECL=220 PAD;
  PUT STFIPS 1-2 CROP 4-6 CODE 8-9 PRG 11-12 GAMSREG 14-17
   @19 NEWACRE 8.2 @28 YLD 7.2 @36 PYLD90 7.2 @44 NITP 4.2 @49 NITQ 6.2
   @56 PHOSP 4.2 @61 PHOSQ 5.2 @67 WATP 5.2 @73 WATQ 4.2 @78 PURCHWAT 4.2
   @83 LABP 4.2 @88 LABQ 5.2 @94 HERB 5.2 @100 INSECT 5.2 @106 FUNGDEF 5.2
   @112 TOTFUEL 6.2 @119 IRRFUEL 6.2
   @126 KREPL 5.2 @132 NEWOVC 6.2 @139 PRICE90 5.2 @145 NMP90 6.3
   @152 LOAN90 6.2 @159 NARP90 4.2 @164 NBASE 9.2 @174 FAILRATE 5.2
   @180 STNAME 3. GAMSST 184-187 FEDNUM 189-190 @192 CRPTREE 8.2
   @202 MAXACRE 8.2 FEDREG 211-214;

RUN;
```

APPENDIX H: GAMSDAT.PRG

```
*************************GAMSDAT.PRG**********************;
** This program reads the basic USARM data set (includes statements;
** for data aggregation), and sets the data in a format that can be read;
** by GAMS. Note that the variable names are slightly different from;
** those defined in the PUT option of the FINAL90.PRG  The new names;
** facilitate comparisons with the 1987 data set;
** Read first the basic data set;

DATA ARM90;
 INFILE 'A:\USARM90B.OUT'  LRECL=230 PAD;
 INPUT STFIPS 1-2 CROP $ 4-6 CODE 8-9 PRG 11-12 GAMSREG $ 14-17
   @19 ACRE90 8.2 @28 YLD90 7.2 @36 PYLD90 7.2 @44 NITP 4.2 @49 NITQ 6.2
   @56 PHOSP 4.2 @61 PHOSQ 5.2 @67 WATP 5.2 @73 WATQ 4.2 @78 PURCHWAT 4.2
   @83 LABP 4.2 @88 LABQ 5.2 @94 HERB 5.2 @100 INSECT 5.2 @106 FUNGDEF 5.2
   @112 TOTFUEL 6.2 @119 IRRFUEL 6.2
   @126 KREPL 5.2 @132 VC90 6.2 @139 PRICE90 5.2 @145 NMP90 6.3
   @152 LOAN90 6.2 @159 NARP90 4.2 @164 BASE90 9.2 @174 FAIL90 5.2
   @180 STNAME $ 3. GAMSST $ 184-187 FEDNUM 189-190 @192 CRPTREE 8.2
   @202 MAXACRE 8.2 FEDREG $ 211-214;

   DROP PURCHWAT;
   ACRE90= ACRE90*1000;
   IF PRG=1 THEN EXT='P';
   ELSE EXT='N';
   IF CODE=1 THEN IRRCODE='I';
   ELSE IRRCODE='D';
   PROC SORT DATA=ARM90; BY EXT CROP IRRCODE GAMSST;


DATA NEWREG;
    SET ARM90;

** Define levels of agregation;
** To obtain the USARM 87 level of aggregation use the following:;

*  GAMSST= GAMSREG;

** To obtain the 10 farm producing regions use the following:;

*  GAMSST= FEDREG;

** To obtain a data set at the State level treat all of the assignment;
** statements below as comments;
** To define new regions use the statements below and use any regional;
** code (e.g., if..... then gamst= r-newl;
** Define the southeast region;

 IF STNAME='AL' THEN GAMSST=FEDREG;
 IF STNAME='FL' THEN GAMSST=FEDREG;
 IF STNAME='GA' THEN GAMSST='R-04';
 IF STNAME='SC' THEN GAMSST=FEDREG;

*Define the Delta States;
```

```
IF STNAME='AR' THEN GAMSST=FEDREG;
IF STNAME='LA' THEN GAMSST=FEDREG;
IF STNAME='MS' THEN GAMSST='R-04';

*Define the North Eastern States;

IF STNAME='CT' THEN GAMSST=FEDREG;
IF STNAME='DE' THEN GAMSST='R-02';
IF STNAME='MD' THEN GAMSST='R-02';
IF STNAME='MA' THEN GAMSST=FEDREG;
IF STNAME='ME' THEN GAMSST=FEDREG;
IF STNAME='NH' THEN GAMSST=FEDREG;
IF STNAME='NJ' THEN GAMSST=FEDREG;
IF STNAME='NY' THEN GAMSST=FEDREG;
IF STNAME='PA' THEN GAMSST=FEDREG;
IF STNAME='RI' THEN GAMSST=FEDREG;
IF STNAME='VT' THEN GAMSST=FEDREG;

*Define the Corn Belt States;

IF STNAME='IL' THEN GAMSST='R-01';
IF STNAME='IN' THEN GAMSST='R-01';
IF STNAME='IA' THEN GAMSST='R-01';
IF STNAME='MO' THEN GAMSST=FEDREG;
IF STNAME='OH' THEN GAMSST=FEDREG;

*Define the Appalachian States;

IF STNAME='KY' THEN GAMSST=FEDREG;
IF STNAME='NC' THEN GAMSST=FEDREG;
IF STNAME='TN' THEN GAMSST='R-04';
IF STNAME='VA' THEN GAMSST='R-02';
IF STNAME='WV' THEN GAMSST=FEDREG;

*Define the Lake States;

IF STNAME='MI' THEN GAMSST=FEDREG;
IF STNAME='MN' THEN GAMSST=FEDREG;
IF STNAME='WI' THEN GAMSST=FEDREG;


*Define the Mountain States;

IF STNAME='AZ' THEN GAMSST=FEDREG;
IF STNAME='CO' THEN GAMSST=FEDREG;
IF STNAME='ID' THEN GAMSST=FEDREG;
IF STNAME='MT' THEN GAMSST= 'R-03';
IF STNAME='NV' THEN GAMSST= FEDREG;
IF STNAME='NM' THEN GAMSST= FEDREG;
IF STNAME='UT' THEN GAMSST= FEDREG;
IF STNAME='WY' THEN GAMSST= FEDREG;

*Define the Pacific States;

IF STNAME='CA' THEN GAMSST= FEDREG;
IF STNAME='OR' THEN GAMSST= FEDREG;
```

```
 IF STNAME='WA' THEN GAMSST= FEDREG;

*Define the Northern Plains;

 IF STNAME='KS' THEN GAMSST= FEDREG;
 IF STNAME='NE' THEN GAMSST= FEDREG;
 IF STNAME='ND' THEN GAMSST= 'R-03';
 IF STNAME='SD' THEN GAMSST= FEDREG;

*Define the Southern Plains;

 IF STNAME='OK' THEN GAMSST=FEDREG;
 IF STNAME='TX' THEN GAMSST=FEDREG;


 IF ACRE90='.' THEN DELETE;
 IF MAXACRE='.' THEN MAXACRE=0;

  PROC SORT DATA=NEWREG;
  BY EXT CROP IRRCODE GAMSST;
*#################################################################;
*The weighting procedure and aggregation are obtained with the following;
**SAS options;

**The following step is to obtain weighted averages of the;
**specified variables;
PROC MEANS MEAN NOPRINT DATA=NEWREG;
      VAR YLD90 PYLD90 FAIL90 NITP NITQ PHOSP PHOSQ
      WATP WATQ LABP LABQ HERB INSECT FUNGDEF TOTFUEL IRRFUEL KREPL
      VC90 PRICE90 LOAN90 NMP90 NARP90;
      BY EXT CROP IRRCODE GAMSST; FREQ ACRE90;

*A temporary data set is created here;
OUTPUT OUT=DATA1 MEAN= YLD90 PYLD90 FAIL90 NITP NITQ PHOSP PHOSQ
      WATP WATQ LABP LABQ HERB INSECT FUNGDEF TOTFUEL IRRFUEL KREPL
      VC90 PRICE90 LOAN90 NMP90 NARP90;


*The following procedure is used to aggregate acreage variables;
PROC MEANS SUM NOPRINT DATA=NEWREG; VAR ACRE90 BASE90 MAXACRE CRPTREE;
  BY EXT CROP IRRCODE GAMSST;

*A temporary data set is created;
  OUTPUT OUT=DATA2 SUM=ACRE90 BASE90 MAXACRE CRPTREE;

**The merging of DATA1 and DATA2 results in the desired level of;
**agregation;
DATA COMBINE2; MERGE DATA1 DATA2;
               BY EXT CROP IRRCODE GAMSST;

* IF CROP='CRP' THEN FARMLAND=FARMLAND/1000;
  ACRE90=ACRE90/1000;
  IF ACRE90='.' THEN DELETE;
* IF ACRE90<0.50 THEN DELETE;
  IF MAXACRE='.' THEN MAXACRE=0;
*IF CROP='SOR' AND PRG=1 AND CODE=1 AND GAMSREG='R-DS' THEN PYLD90=YLD90;
```

```
* define a code number for crops;
 IF CROP='BAR' THEN DO;  CROPNUM=1; END;
 IF CROP='COR' THEN DO;  CROPNUM=2; END;
 IF CROP='COT' THEN DO;  CROPNUM=3; END;
 IF CROP='CRP' THEN DO;  CROPNUM=4; END;
 IF CROP='HAY' THEN DO;  CROPNUM=5; END;
 IF CROP='OAT' THEN DO;  CROPNUM=6; END;
 IF CROP='RIC' THEN DO;  CROPNUM=7; END;
 IF CROP='SOR' THEN DO;  CROPNUM=8; END;
 IF CROP='SOY' THEN DO;  CROPNUM=9; END;
 IF CROP='WHE' THEN DO;  CROPNUM=10; END;

 RMP90=PRICE90;
 DPCST=0;
 IF EXT='N' THEN PRG=0; ELSE PRG=1;

 PROC SORT DATA=COMBINE2; BY EXT CROP IRRCODE GAMSST;


** Set the final data set;

DATA GAMS1; SET COMBINE2;
 FILE 'A:\GAMS90.OUT' LRECL=230 PAD;
  PUT EXT 2 @3 '.' IRRCODE 4 @5 '.' CROP 6-8 @9 '.' GAMSST 10-13
   @15 ACRE90 8.2 @24 YLD90 7.2 @32 PYLD90 7.2 @40 NITP 4.2 @45 NITQ 6.2
   @52 PHOSP 4.2 @57 PHOSQ 5.2 @63 WATP 5.2 @69 WATQ 4.2
   @79 LABP 4.2 @84 LABQ 5.2 @90 HERB 5.2 @96 INSECT 5.2 @102 FUNGDEF 5.2
   @108 TOTFUEL 6.2 @115 IRRFUEL 6.2

   EXT 122 @123 '.' IRRCODE 124 @125 '.' CROP 126-128 @129 '.' GAMSST 130-133
   PRG 137 @139 KREPL 5.2 @146 VC90 6.2 @154 RMP90 5.2 @161 NMP90 6.3
   @168 LOAN90 6.2 @175 NARP90 4.2 @180 DPCST 4.2 @185 BASE90 9.2 @195 FAIL90
5.2
   CROPNUM 201-202  @204 MAXACRE 9.2 @214 CRPTREE 8.2;

 RUN;
```

APPENDIX I: CRPCB.PRG

```
*****************************CRPCB.PRG*************************;
**This program creates a data set for base acreage retired in CRP, by;
**crops;

DATA CRP90A;
 INFILE 'A:\CRP90\USARM.CRP' PAD LRECL=200;
 INPUT PRG STFIPS STATE $ CRPBASE CRPACRE CRPBAR CRPCOR CRPCOT
       CRPRIC CRPWHE CRPSOR CRPOAT COSTSHR PRICE ;

**The variables of interest are CRPBAR (base acreage retired for barley),;
**CRPCOR (base acreage retired for corn), and so on;

 DROP COSTSHR PRICE CRPBASE CRPACRE;
 IF PRG=0 THEN DELETE;
 IF STFIPS=2 OR STFIPS=3 OR STFIPS=15 OR STFIPS=43 THEN DELETE;
 PROC SORT DATA=CRP90A; BY STFIPS;

*Read the data set with geographical codes for data aggregation;
DATA GAMSREG;
 INFILE 'A:\GAMSREG.DAT' PAD LRECL=50;
 INPUT FEDREG $ GAMSREG $ STFIPS STNAME $ FEDNUM GAMSST $;

 IF FEDNUM=1  THEN FEDREG= 'R-PS';
 IF FEDNUM=2  THEN FEDREG= 'R-MT';
 IF FEDNUM=3  THEN FEDREG= 'R-NP';
 IF FEDNUM=4  THEN FEDREG= 'R-SP';
 IF FEDNUM=5  THEN FEDREG= 'R-LS';
 IF FEDNUM=6  THEN FEDREG= 'R-CB';
 IF FEDNUM=7  THEN FEDREG= 'R-DS';
 IF FEDNUM=8  THEN FEDREG= 'R-NE';
 IF FEDNUM=9  THEN FEDREG= 'R-AP';
 IF FEDNUM=10 THEN FEDREG= 'R-SE';


 PROC SORT DATA=GAMSREG; BY STFIPS;

**Merge the above data sets;

DATA COMBINE;
  MERGE CRP90A GAMSREG; BY STFIPS;
  IF PRG='.' THEN DELETE;

DATA NEWCRP;
    SET COMBINE;

*Define the level of aggregation consistent with the dat set generated;
*with GAMSDAT.PRG;

*If you want to generate the CRPCB data consistent with the 1987 USARM;
* data set use the following statement;

*GAMSST=GAMSREG;

*If you want to generate the CRPCB data for the 10 farm producing regions;
```

```
*use the following statement;

*GAMSST=FEDREG;

*To define new regions, use the statements below;
*To obtain a data set at the State level, treat all of the assignment;
*statements as comments;

*Define the South East region;

 IF STNAME='AL' THEN GAMSST=FEDREG;
 IF STNAME='FL' THEN GAMSST=FEDREG;
 IF STNAME='GA' THEN GAMSST='R-04';
 IF STNAME='SC' THEN GAMSST=FEDREG;

*Define the Delta States;

 IF STNAME='AR' THEN GAMSST= FEDREG;
 IF STNAME='LA' THEN GAMSST= FEDREG;
 IF STNAME='MS' THEN GAMSST= 'R-04';

*Define the North Eastern States;

 IF STNAME='CT' THEN GAMSST=FEDREG;
 IF STNAME='DE' THEN GAMSST='R-02';
 IF STNAME='MD' THEN GAMSST='R-02';
 IF STNAME='MA' THEN GAMSST=FEDREG;
 IF STNAME='ME' THEN GAMSST=FEDREG;
 IF STNAME='NH' THEN GAMSST=FEDREG;
 IF STNAME='NJ' THEN GAMSST=FEDREG;
 IF STNAME='NY' THEN GAMSST=FEDREG;
 IF STNAME='PA' THEN GAMSST=FEDREG;
 IF STNAME='RI' THEN GAMSST=FEDREG;
 IF STNAME='VT' THEN GAMSST=FEDREG;

*Define the Corn Belt States;

 IF STNAME='IL' THEN GAMSST='R-01';
 IF STNAME='IN' THEN GAMSST='R-01';
 IF STNAME='IA' THEN GAMSST='R-01';
 IF STNAME='MO' THEN GAMSST=FEDREG;
 IF STNAME='OH' THEN GAMSST=FEDREG;

*Define the Appalachian States;

 IF STNAME='KY' THEN GAMSST=FEDREG;
 IF STNAME='NC' THEN GAMSST=FEDREG;
 IF STNAME='TN' THEN GAMSST='R-04';
 IF STNAME='VA' THEN GAMSST='R-02';
 IF STNAME='WV' THEN GAMSST=FEDREG;

*Define the Lake States;

 IF STNAME='MI' THEN GAMSST=FEDREG;
 IF STNAME='MN' THEN GAMSST=FEDREG;
 IF STNAME='WI' THEN GAMSST=FEDREG;
```

```
*Define the Mountain States;

 IF STNAME='AZ' THEN GAMSST=FEDREG;
 IF STNAME='CO' THEN GAMSST=FEDREG;
 IF STNAME='ID' THEN GAMSST=FEDREG;
 IF STNAME='MT' THEN GAMSST='R-03';
 IF STNAME='NV' THEN GAMSST=FEDREG;
 IF STNAME='NM' THEN GAMSST=FEDREG;
 IF STNAME='UT' THEN GAMSST=FEDREG;
 IF STNAME='WY' THEN GAMSST=FEDREG;

*Define the Pacific States;

 IF STNAME='CA' THEN GAMSST=FEDREG;
 IF STNAME='OR' THEN GAMSST=FEDREG;
 IF STNAME='WA' THEN GAMSST=FEDREG;

*Define the Northern Plains;

 IF STNAME='KS' THEN GAMSST=FEDREG;
 IF STNAME='NE' THEN GAMSST=FEDREG;
 IF STNAME='ND' THEN GAMSST='R-03';
 IF STNAME='SD' THEN GAMSST=FEDREG;

*Define the Southern Plains;

 IF STNAME='OK' THEN GAMSST=FEDREG;
 IF STNAME='TX' THEN GAMSST=FEDREG;


  PROC SORT DATA=NEWCRP;
  BY GAMSST;

*The following SAS procedure is used to aggregate variables;

  PROC MEANS SUM NOPRINT DATA=NEWCRP;
  VAR CRPBAR CRPCOR CRPCOT CRPRIC CRPWHE CRPSOR CRPOAT;
  BY GAMSST;
  OUTPUT OUT=CRPBASE SUM= CRPBAR CRPCOR CRPCOT CRPRIC CRPWHE CRPSOR CRPOAT;

**Correct for units of measure;
  DATA CRPZ;
   SET CRPBASE;
   KEEP GAMSST CRPBAR CRPCOR CRPCOT CRPRIC CRPWHE CRPSOR CRPOAT;
   CRPBAR=CRPBAR/1000;
   CRPCOR=CRPCOR/1000;
   CRPCOT=CRPCOT/1000;
   CRPRIC=CRPRIC/1000;
   CRPWHE=CRPWHE/1000;
   CRPSOR=CRPSOR/1000;
   CRPOAT=CRPOAT/1000;

   FILE 'A:\CRP90\CRPCB.OUT' PAD;
   PUT GAMSST 1-5 @7 CRPBAR 10.3 @18 CRPCOR 10.3 @29 CRPCOT 10.3
       @40 CRPRIC 10.3 @51 CRPWHE 10.3 @62 CRPSOR 10.3 @73 CRPOAT 10.3;
```

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